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DUPLICATE

CATCHING'S COMPENDIUM

OF

PRACTICAL DENTISTRY

For 1895.

B. H. CATCHING, D. D. S.
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ANNOUNCEMENT.

I have, in this issue of the COMPENDIUM, added a new department—Science in Dentistry. The time allotted to the editors was hardly sufficient for them to make the department as complete as they desired, though their work will stand the mark of criticism.

The profession, I am sure, will appreciate this addition, which now makes the COMPENDIUM a review of dentistry complete.

Neither labor nor expense have been spared to give the dentist work that should be his constant companion.

With a corps of editors in foreign fields, and additional editorial assistance at home, the cost of getting out the work has been much increased. Hence, the price is made $3.00.

B. H. CATCHING.

INDEX.

OPERATIVE DENTISTRY—

Amalgam, copper 13
Amalgam, filling a tooth with ..... JENNINGS. 13
Amalgam, how to manipulate ..... HEWETT. 11
Amalgam, manipulating for fillings ..... ARRINGTON. 14
Amalgam, preparation of ..... LORD. 16
Amalgam, to secure water-tight fillings with ..... TOMES. 15
Cement, carrying to cavities ..... TAYLOR. 16
Cement, mixing ..... AMES. 16
Cement, oxyphosphate copper ..... JOHNSON. 17
Cement, oxyphosphate, using ..... GRAY. 17
Clamp, adjusting plainlessly 255
Dam, rubber holding on teeth ..... CROUSE. 265
Dam, rubber, placing on lower front teeth ..... TEMPLETON. 17
Dam, rubber retractor ..... BROCKWAY. 18
Fillings, amalgam, removing mercury from ..... KIRK, 19
Fillings, arch or span ..... MILLS. 19
Fillings, copper amalgam and cement ..... STAW. 23
Fillings for temporary teeth ..... CRAWFORD. 25
Fillings, gold finishing ..... DARBY. 24
Fillings, gold, with hand burnishers ..... LIBBY. 34
Fillings, gold, contour incisor, anchoring ..... CROSS. 23
Fillings, gold, contour, anchoring ..... JOHNSON. 20
Fillings, gold, old, testing for leaks ..... ALLAN. 25
Fillings, temporary, to make vent holes in 25
Gum, overhanging, to remove 25
Heat, to apply to a tooth 26
Matrices, German silver ..... BRONSON. 26
Molars, badly decayed, to extract ..... THOMAS. 27
Molars, impacted third, extracting ..... HARLAN. 28
Molars, impacted third, extracting ..... FOREMAN. 28
Pulp, application of arsenious acid to ..... BORLAND. 29
Pulp, destroying and removing ..... JOHNSON. 30
Pulp, devitalized, removing 33
Pulp, hemorrhage after removal ..... EGGLESTON. 33
Pulp, mumifying ..... SODDERBERG. 34
Pulp of temporary teeth, destroying ..... STANLEY. 30
Pulp protection 34
Pulp protection ..... PATTERJON. 34
Pulp protection ..... HOWE. 35
Pulp removal ..... BOSWELL. 36
Pulpitis 36
Pulpitis ..... HARNED. 37
Pulpitis, from arsenic ..... LEROY. 37
Pulpitis, treatment ..... KIRK. 37
Root, amputation of 37

OPERALIVE DENTISTRY—CONTINUED.

Root canal, cleansing.....HARLAN. 38
Root canal, to dry 38
Root canal, filling.....CUSHING. 38
Root canal, filling.....PERRY. 39
Root canal, filling.....JACK. 43
Root canal, filling.....SHEPARD. 43
Root canal, filling.....LITTIG. 43
Root canal, filling.....CRAWFORD. 43
Root canal, filling.....TAFT. 43
Root canal, filling.....BLACK, 44
Root canal, filling .....CROUSE. 44
Root canal, filling.....ANDREWS. 44
Root canal, filling.....IVES. 44
Root canal, filling, celluloid for..... ALLEN. 44
Root canal, filling, cotton for.....PEIRCE AND FLAGG. 45
Root canal, filling, eucalypto-percha for.....MAGILL. 45
Root canal, filling, oxide zinc and eugenol.....LUCKIE. 46
Root canal, filling apex with gold.....DALY. 46
Root canal, filling with salol.....DEAN. 46
Root canal, filling, immediate, treating with sulphuric acid. WELCH. 50
Root canal, sterilization.....JARVIE. 47
Root canal, sterilization.....JACK. 47
Root canal, sterilization .....KIRK. 48
Root canal, sterilization.....HARLAN. 48
Root canal, sterilization .....PEIRCE. 48
Root canal, sterilization .....GUILFORD. 48
Root canal, sterilization .....MARSHALL. 48
Root canal, sterilization.....McQUILLAN. 49
Root canal, sterilization.....LITTIG. 49
Root canal, sterilization.....CRAWFORD. 49
Root canal, sterilization.....TRUMAN. 49
Root canal, sterilization..... BLACK. 50
Root canal, sterilization.....ANDREWS 49
Root canal, sterilization.....CROUSE. 50
Root, drilling through apex 38
Root posts, wire brads for .....MITCHELL. 51
Saliva, excessive flow of, to control.....LOGUE. 51
Salol, practical uses of.....SANGER. 51
Silver nitrate, convenient application of.....HOLMES. 54
Sponge grafting.....BRIGGS. 54
Stain, green, removing.....PALMER. 54
Teeth, bleaching.....KIRK. 55
Teeth, bleaching.....FLAGG. 55
Teeth, bleaching, electricity and pyrozone for.....KIRK. 55
Teeth, bleached. to prevent rediscoloration of .....ST. JOHN. 55
Teeth, cleaning 56
Teeth, deciduous, pulpless, treating.....BROWN. 56
Teeth, deciduous, pulpless, treating .....CRAWFORD. 57
Teeth, front, badly decayed, repairing.....MURLESS. 58
Teeth, lower front, loose, staying.....TRUEMAN. 59

OPERATIVE DENTISTRY—CONTINUED.
Teeth, pulpless, with fistulous opening, to fill ..... JOHNSON. 60
Teeth, separating..... CHUPEIN. 62
Teeth, separating 62
Teeth, separating, cork for ..... DENHAM. 62
Zinc phosphates, accurate using of..... FLAGG. 62

PROSTHETIC DENTISTRY—

Air chambers, correct position of..... BURCHARD. 65
Aluminum as a base for dentures..... JOHNSON. 67
Bite, short, rubber teeth for..... PELHAM. 69
Compound, modeling, remove from cast. ..... MESSERSCHMIDT. 70
Clasps for partial dentures..... MESSERSCHMIDT. 69
Clasps, rubber lined..... BOWENTHALL. 70
Cups, impression, to clean..... EDGERS. 70
Cups, impression, to clean..... LEEMING. 70
Cups, special, to make..... CATCHING. 71
Cups, impression, using old plate for..... AMES. 71
Dies for swaging..... 71
Dies, to make for small cases..... BAKER. 72
Flasks, to prevent plaster sticking to..... 72
Gum work, continuous..... ROSE. 72
Impression for metal model..... 75
Impression for partial cases..... CATCHING. 76
Impression, glazier's putty for..... ELLIOTT. 76
Impression, plaster, acasia added..... WILLIAMS. 75
Impression, taking..... STEELE. 77
Joints, dark, to prevent..... BOXTON. 77
Joints, to prevent rubber entering..... TEMPLETON. 77
Metal, babbitt, formula for, and dies..... HASKELL. 78
Models, plaster, covering with tin foil..... CATCHING. 78
Models, plaster and marble dust..... TEMPLETON. 78
Models, treating for dentures..... MOLYNEAUX. 79
Plate, base, fusible alloy for..... CHUPEIN. 86
Plate, clasp..... HARPER. 88
Plate, gold, partial, rapid method of making..... STOWELL. 89
Plate, making, first bicuspid left off in..... GREEN. 90
Plate, rubber, black, to make jet black..... CHAIM. 92
Plate, rubber, refitting..... DAVENPORT. 90
Plate, rubber, refitting..... PAGIN. 91
Plate, rubber, refitting..... DAVIS. 100
Plate, rubber, remodeling..... ROBERTSON. 93
Plate, rubber, repairing..... CRAWFORD. 94
Plate, rubber, to line with aluminum..... PIXTON. 92
Plate, rubber, to remove stains from..... 94
Plate, rubber, to trim..... TEMPLETON. 94
Plate, rubber, to temporarily attach tooth to..... LENNOX. 95
Plate, rubber, beaded or grooved..... HOWE. 97
Plate, rubber, strengthening..... MORELY. 100

PROSTHETIC DENTISTRY—CONTINUED.

Plate, rubber, to prevent loose teeth on....BOXTON. 114
Plate, suspension....ALEXANDER. 95
Plate, swaged, adapting to mouth....POWELL. 96
Plate, to prevent plaster sticking to....TEMPLETON. 85
Plate, upper, articulating with lower front teeth.... 97
Plate, upper, to exhaust air from under.... 100
Reliefs instead of air chambers.... HASKELL. 103
Rubber, old, to remove from artificial teeth....BERHARD. 111
Rubber, packing directly on the model....SUNDERLAND. 103
Teeth, articulation with special reference to the Bonwill method.. AUBREY. 106
Teeth, masking with....DREW. 111
Teeth, to remove old rubber from....BERHARD. 111
Teeth, reshaping....CATCHING. 111
Teeth, reshading....ESSIG. LEE. 111
Vulcanizing finished surface....MACALASTER. 114
Vulcanizing on metals.... 114

CROWN AND BRIDGE WORK—

Bridge and plate work combined....CONDIT. 115
Bridge, lower incisor....HOWELL. 121
Bridge, precaution in soldering....EVANS. 122
Bridge, tube teeth....SPALDING. 122
Bridge, tube teeth....CALLAHAN. 123
Bridge, rational method of constructing....MILLER. 140
Crown, a cheap....SPARKS. 128
Crown, amalgam-porcelain....NUKI. 126
Crown, articulation for...."BUFF." 126
Crown, Bowers'....BOWERS. 128
Crown, Downie, replaced by Bonwill....CATCHING. 129
Crown for temporary teeth....OTTOFY. 152
Crown, gold, made easily removable....WHITE. 130
Crown, gold, new method of preparing....MILLS. 131
Crown, gold, strengthening for abutments....KEEMER. 131
Crown, gold, to solder cap on....TEMPLETON. 130
Crown, Logan, adapting....OTTOLINGUI. 133
Crown, Logan, banding....HINMAN. 133
Crown, Logan, mounting....STEVENSON. 136
Crown, Logan, setting....HUCKLER. 136
Crown, metal, porcelain face....LITTIG. 137
Crown, porcelain face....GALLIE. 137
Crown, porcelain face.... TAGGART. 138
Crown, stamped, filling cusps of....TAYLOR. 128
Crown, quickly made....VAN WOERT. 138
Crown, quickly made.... BARNER. 139
Crown, rational method of constructing....MILLER. 140
Crown with access to pulp chamber....LOGAN. 139
Crowning badly decayed roots....CHANCE. 151
Crowning fractured tooth....MITCHELL. 129

CROWN AND BRIDGE WORK—CONTINUED.

Crowning temporary teeth....OTTOFY. 152
Cusps for gold crowns, swaging....CATCHING. 143
Enamel, removing for crown....WEEKS. 144
Facing, porcelain, backing to prevent cracking....SANDUSKY. 145
Facing, porcelain, backing and protecting....GOSLER. 146
Facing, replacing....TWILLEY. 147
Facing, replacing....JENKINS. 148
Impression, for crown, aid to taking....CHUPEIN. 148
Inlay, matrix for....GENESE. 149
Inlay, porcelain.... 149
Inlay, setting....SEYMORE. 149
Paper, carbon, substitute for....ESHLEMAN. 150
Posts for Bonwill crown, to make....SPARKS. 150
Root canal, guide to reaming....EVANS. 150
Teeth, elongated, to shorten....YOUNGER. 153
Teeth, tipping with porcelain....CRAWFORD. 152

ORTHODONTIA—

A new method of applying force in regulating teeth....ANGLE. 159
Appliances, retaining, enameling....MITCHELL. 159
Facial contours, esthetic correction of....CASE. 165
Irregularities, with cases....MATTESON. 174
Luxation,or the immediate method of treating irregularities....
CUNNINGHAM. 179
Regulating appliances and anchorage for same....FARRAR. 173
Regulating teeth supplemented by crown work....WILLIS. 181
Space in dental arch closed by regulating teeth....YOUNGER. 164
Turning both upper lateral incisors at the same time....FARRAR. 154
Teeth, moving en masse....FARRAR. 183

DENTAL MEDICINE—

Acid, lactic, as bone solvent....YOUNGER. 188
Anesthetic, local.... 188
Anesthetic, local....LENNOX. 188
Anesthetic, local....LEGGO. 189
Anesthetic, local.... 189
Aphthous sores.... 190
Balsamo del deserto....WHITE. 190
Bone solvent, lactic acid.... 188
Cassia, oil of and turpentine....WHITE. 190
Cocoaine, hypodermic use of....HINMAN. 191
Cocoaine solution....HOFF. 190
Dentine, sensitive, obtundent....TAFT. 193
Dentine, sensitive, obtundent.... 194
Dentine, sensitive, obtundent....ANDREWS. 194
Dentine, sensitive, obtundent....BOYD. 194
Dentine, sensitive, obtundent....FRANCIS. 195
Dentine, sensitive, obtunding....HARWOOD. 194
Dentifrice, musk.... 195

DENTAL MEDICINE—CONTINUED.

Dentifrice, paste 245
Electricity as a therapeutic agent ..... SIMPSON. 195
Extraction, pain after ..... THOMAS. 196
Extraction, pain after ..... BENNETT. 197
Formalin for treating diseased pulps and roots ..... SJOBERG. 197
Gums, diseased, aid to treating ..... CATCHING. 198
Gum margin, restoring ..... COOL. 197
Hemorrhage, dental ..... McDONALD. 198
Hemorrhage, dental 199
Hemorrhage, dental ..... ARNOLD. 200
Hemorrhage, dental ..... BROPHY. 203
Hemorrhage, dental ..... YEARIC. 205
Hemorrhage, dental 205
Hemorrhage, dental ..... PAGUE. 206
Hemorrhage, dental, electricity for ..... JENNISON. 206
Hemorrhage, dental, lycoperdon for ..... BREWSTER. 199
Iodine and creosote 206
Iodine solution, some points on ..... AMES. 206
Mytol for root canals ..... HARLAN. 208
Necrosis of alveoli and maxilla ..... MILLS. 208
Paste, nerve ..... JOHNSON. 210
Paste, nerve ..... DIACK. 210
Pericementitis, acute 210
Pericementitis, treatment ..... RAFFENSPERGER. 210
Poultcing a tooth ..... HUGENSCHMIDT. 239
Potash, permanganate and peroxide hydrogen ..... BARKER. 211
Pus pockets 217
Pyorrhea alveolaris ..... CRAVENS. 217
Pyorrhea alveolaris, extracting and replanting, to cure ..... HARDY. 222
Pyorrhea alveolaris treatment ..... ELLIOTT. 222
Pyorrhea alveolaris, sulphuric acid for ..... HUGENSCHMIDT. 223
Pyorrhea alveolaris, treatment ..... NEWKIRK. 223
Pyorrhea alveolaris, treatment ..... SUDDUTH. 224
Pyorrhea alveolaris, Dobell's solution for 234
Pyorrhea alveolaris, wash for ..... HARLAN. 234
Root canals, formalin for ..... SJOBERG. 197
Root canals, putrescent, myrtol for ..... HARLAN. 208
Root canals, putrescent, treatment ..... BARKER. 211
Root canals, putrescent, and resultant lesions ..... HODGEN. 211
Root canals, putrescent, sodium potassium for 237
Root canals putrescent, treatment ..... WASSALL. 218
Rubefacients and vesicants ..... HARLAN. 235
Stérésol ..... KIRK. 237
Stimulant after prolonged operations ..... JONES. 238
The use of certain drugs in nervous conditions, etc ..... COOL. 240
Toothache remedy 239
Toothache remedy 239
Ulyptol 244

DENTAL MEDICINE—CONTINUED.
Vomiting, excessive 244
Wash, mouth, antiseptic . . . . . Novy. 244
Wash, tooth 245

ORAL SURGERY—

Antrum, washing out . . . . . Babcock. 246
Jaw, lower, fracture of . . . . . Coon. 246
Jaw, lower, fracture, splint for . . . . . Gilmer. 248
Nasal prosthesis . . . . . Hollingsworth. 249

MISCELLANEOUS—

Air, compressed, in dentistry . . . . . Southwell. 253
Alloy, new, resembling gold 254
Aluminum, to frost 254
Amalgam, picking up . . . . . Thomas. 255
Asbestos, to powder 255
Bag, gas, to repair 267
Band, material . . . . . Brabson. 255
Broaches, piano wire, to make . . . . . Greenlaw. 256
Burs, to keep clear of débris 255
Cable, broken, to mend . . . . . Steele. 256
Cast, plaster, to clean 256
Cement for china 257
Cement filling material . . . . . Seikel. 257
Cement for ivory 257
Cement for mother of pearl 258
Cement for china 259
Cement, liquid for mixing 258
Cement, mixing and tinting . . . . . Fernandez. 258
Cicatrices, treating . . . . . Ware. 260
Clamp, adjusting painlessly 259
Clamp, cervical, to make . . . . . Bryan. 259
Clamps, to replate . . . . . Miller. 274
Cleansing fluid 261
Coal oil in laboratory . . . . . Burchard. 261
Cord, engine . . . . . Martin. 267
Dam, aid to cutting . . . . . Murless. 266
Dam, holding on teeth . . . . . Crouse. 265
Dam, restoring and correcting odor . . . . . Wiber. 264
Dam, stopping holes in . . . . . Cool. 265
Disks, corundum, mounting with cement . . . . . Chupein. 266
Dies, crown, steel, to make . . . . . Norris. 266
Gold catcher . . . . . McKim. 268
Gold, spring or clasp 268
Gutta-percha points, to make . . . . . Matteson. 268
Gutta-percha points, to make . . . . . Mitchell. 268
Gutta-percha, to preserve 269
Headache . . . . . Kirk. 269
Instruments, cutting, to temper 270

MISCELLANEOUS—CONTINUED.

Instruments, exploring ..... MERRIAM. 269
Instruments, to sterilize 269
Iodoform, odor, to correct 269
Ladles, iron spoons for 270
Lacquer the color of gold 270
Lead, to separate from zinc 270
Light, day, to control, etc ..... VAN ORDEN. 262
Mandrels, disk, to make of wire nails 270
Mandrels, disk, to make of old burs ..... CATCHING. 271
Metal, fusible, Dalton's 271
Metal, fusible, Newton's 271
Mirror, magnifying, aid to operating 267
Mirror with shell shaped rim ..... BRYAN. 272
Mirror, with sponge holder ..... BRYAN. 271
Nails, finger, care of 272
Plate, platinum and gold, to make ..... TEMPLETON. 273
Probes, silver ..... BROPHY. 273
Publications 312
Pyrozone tubes, to open 273
Rubber articles, repairing ..... STEELE. 254
Scraper, vulcanite, to make 274
Solders, gold ..... TEMPLETON. 275
Solders, gold 276
Soldering, old, to resolder ..... PATTERSON. 274
Stain, blood, to remove 275
Stain, iodine, to remove 275
Stain, oil of cassia, to remove from teeth 275
Syringe, hypodermic, treatment 277
Syringe, hot air, home-made ..... LOVEJOY. 277
Table, bracket, cover 277
Table, work, cover ..... STEELE. 278
Vaseline, test for 278
Weight, equivalents 279
Wheel, lathe, wetter 278
Wheel, polishing ..... DAVIS. 279
Wedges, oiled, etc ..... HARLAN. 279

SCIENCE IN DENTISTRY—

Amalgams as chemical compounds ..... BURCHARD. 292
An investigation of the physical characters of the human teeth in relation to their diseases, etc ..... BLACK. 280
Calcification of the teeth ..... ANDREWS. 302
Coagulants in the treatment of pulp canals ..... KIRK. 293
Coagulants and non-coagulants ..... HARLAN. 297
Coagulants, relative power of ..... TRUMAN. 306
Origin of salivary calculi ..... BURCHARD. 295
The relation of adenoid vegetation to irregularities of the associate parts ..... EAMES. 298

OPERATIVE DENTISTRY.

AMALGAM AND HOW TO MANIPULATE IT.

DR. A. C. HEWITT, CHICAGO.

Items of Interest, July.

The cavity should be prepared as conscientiously as for gold filling, sterilized and desiccated. To aid in doing the latter readily the following may be used as dentinal desiccant:

℞—Alcohol (pure) ..... fl. ℥v.
Chloroform ..... fl. ℥iij.
Beta naphthol ..... grs. v.
M. Apply to flood the cavity thoroughly and evaporate with warm or heated air.

Stress is laid on this part of the work, for if moisture lies back of the imposed plastic, especially if the alloy contains copper, there will be oxidation and precipitation of salts to blacken tooth substance and invite influx of oral fluids.

Unless we realize how difficult it is to bar moisture from any place, we will underestimate the need of the care advised. Next, the surfaces to be covered in by the amalgam should be coated well with some resinous solution for two purposes. First, to bar moisture, and second to form a sticky base in and on which to grind particles of the alloy. For this purpose the following is used with gratifying success:

℞—Sandarach varnish,
Damar varnish ..... āā fl. ℥j.
Alcohol (absolute) ..... fl. ℥j.
Beta naphthol ..... gr. v.
M. Apply as a varnish.

When the liquids have evaporated, leaving the resins as a lining for the cavity, the dentine and enamel should receive another coating, this time of amalgam burnished on to the varnish with a

smooth-point amalgam plugger, flat-faced or shot-pointed, till the cavity floor and walls take on a mirror-like surface. By thus burnishing the amalgam on the walls, every tubule and enamel interstice will be filled and brightened over.

The amalgam for this first coating may be well saturated with mercury, but only sufficient of the moist mass left to form a thin coating, all surplus possible being poked or burnished out of the cavity. From thence on, amalgam wrung through heavy muslin or chamois only is to be used; one layer after another burnished on to the preceding one, each added mass being as dry as can be and cohering to the preceding one. If free mercury is thus brought to the surface of the plug, it should be poked or burnished out before another dry mass is added. Keep the growing mass dry. Thus build till the cavity is rounding full, care having been taken that every undercut, fissure, nook and corner is densely filled, not with free mercury, but with the alloy. When the cavity is more than full, rounded over like a bushel of potatoes in a basket, coax the surplus mercury to the highest point by gentle pats or tapping with the plugger, and while thus atop, absorb it (free mercury) with tin foil No. 4, rolled into balls, or what is better, bricks of Watt's crystal gold No. 2, freshly annealed in a lamp flame. When the free mercury is thus disposed of, the surplus amalgam is to be burnished down to a proper level with a hand-shot point, or a steel Herbst point in an engine hand-piece, rapidly driven, moving the instrument from the center toward and over the enamel borders. Thus the line of free mercury, always tending to cling to enamel border, will be taken up and carried off by the drier surplus portion of the filling. Before removing the dam, varnish the plug. In mixing the amalgam, the bare palm of the hand and the bare finger should never be used. Enough oil and moisture, from a bare palm, can be worked out to saturate an ordinary sized mass for a filling. Dry the cavity; keep it dry. Prepare the amalgam free from oils and water; pack densely; absorb surplus mercury. At a future sitting polish the filling. If good alloy is used and this care is taken in the manipulating, but few workers will live long enough to see the need of a repair.

COPPER AMALGAM.

Many claim to use this material successfully, by adding alloy filings to take up the surplus mercury in the copper amalgam, while mixing.

FILLING A TOOTH WITH AMALGAM.

DR. W. M. JENNINGS, CLEVELAND, O.

Ohio Dental Journal, December.

For example, a second lower left molar, with a posterior proximal cavity extending considerably under the gum and involving about two-thirds of the crown. Of course, from the size of the cavity, the nerve would be exposed, and having removed it and filled the roots properly, proceed as follows:

Prepare the cavity, having the edges smooth and the inside slightly larger than the opening; then fill it about two-thirds full with a good cement and allow it to harden. After this trim the edges of the cavity, so that no cement adheres to them, and also trim the cement inside just enough to leave a sufficient undercut and space to allow contouring of filling. Now select a screw matrix of suitable size for tooth (German silver or steel are the best, as they do not amalgamate) and put around the tooth, crowding down under the gum sufficient to go below the edge of the cavity, but before tightening put another piece of German silver between the tooth and band matrix, also below the edge of the cavity; now tighten the band. Before putting in the filling take an excavator and trim the borders of the cavity and remove all roughness of edge next to matrix, if any has been caused by putting it on; we are now ready for the filling. Mix the amalgam very dry, having it resemble an almost dry powder, and carry it to the cavity with a small amalgam spoon; press a small quantity into the cavity with a plastic plugger of the proper size; now with engine use a small size (smooth, round) burnisher and rotate it quite rapidly in cavity. Add more amalgam and use burnisher same as before, and do so until the cavity is full and the amalgam is quite hard; then with a larger burnisher rotate it rapidly over a piece of tinfoil placed on the filling. Trim the filling down and

carefully remove first the screw matrix then the other one. Now trim the filling as near as possible to the original shape of the tooth, seeing that the articulation is right. Polish at another sitting. A filling put in in this manner is much better and more satisfactory than by simply using hand pressure, and does not change position in crystallization as in the other way, as the tin takes up all excess of mercury, leaving the filling almost hard after it is inserted.

MANIPULATING AMALGAM FOR FILLING.

DR. B. F. ARRINGTON, GOLDSBORO, N. C.

Southern Dental Journal, November.

Mix in the palm of the hand, moistening filings and mercury slightly with a weak solution of sulphuric acid (one of acid to thirty or forty of water is quite strong enough), work to partial consistency, then grind in the mortar, after which remove to hand again and wash with water, followed by alcohol. Place the mass in a piece of chamois skin, and twist with force to extent of strength of fingers for removal of mercury until the smallest globules cease to pass through the skin (there is always sufficient mercury left in the mass after extreme force for removal has been applied); then flatten the mass in the skin to desired thickness (from the sixteenth to the twenty-fourth of an inch generally), turn out upon a slab for the purpose, and cut into blocks or squares suitable to size (diameter) of cavity. Moisten walls of cavity carefully with creosote and dry with bibulous paper before filling. If the cavity is deep and the nerve pulp is nearly exposed, place over the base of the cavity a piece of thin sheet lead, the thirty-second or fortieth of an inch thick, then fill the cavity one-third or half full of best quality of gutta-percha stopping, pack and work it well to the walls and condense thoroughly, then convey the amalgam carefully with serrated amalgam conveyors. Never choke or stuff cavity hastily with amalgam, but introduce carefully, piece after piece, condensing, spreading, and forcing to walls with smooth surface pluggers (never with pellets of bibulous paper), varying motion of pluggers and manipulation of material to secure success in perfect

adaptation of material to every irregularity in cavity and surface fissures, to completion of operation.

If the cavity is large and deep it will be well to apply tin pellets for removal of excess of mercury, if any, during an operation, before the surface is reached. Upon the surface apply with force, pellet after pellet (several), first on center of surface of filling, then specially around the edges and over fissures, to which the excess of mercury has been forced. Complete finish of the surface of filling with soft pine sticks, wedge-shaped or pointed, as indicated, and pulverized pumice or pellets of cotton or bibulous paper, held with pliers and moistened, to hold the pumice. After the amalgam has sufficiently set or hardened, say from two to three hours, give the final finish to surface with orange-wood stick or hickory and pumice, chalk, etc. Burnishing is never necessary, nor is it in any way advantageous on amalgam fillings.

OBSERVATIONS ON THE WORKING OF AMALGAM TO SECURE WATER-TIGHT FILLINGS.

British Journal Dental Science, March.

After many experiments by Mr. C. S. Tomes, to secure perfect water-tight fillings of amalgam, the following conclusions are drawn:

With the exception of palladium it was found impracticable to get absolute water-tightness by any methods of packing in vogue.

Perfect results can be obtained by making the mass of an osteoplastic, using the amalgam only as a protective agent, to keep the fluids of the mouth from having access to the plastic filling.

Advantage, short of perfect results, can be got by diminishing the amount of fresh amalgam with its shrinkage still to do, whether by imbedding rings, lumps of hard amalgam, or other foreign bodies in the soft mass.

The larger the mass the worse the shrinkage; no large filling should, therefore, ever be composed of fresh amalgam alone.

Absolutely perfect results can very generally be got by using

old standard amalgam heated and packed in small pieces, burnishing it well against the walls, but this is troublesome, and in some classes of cavity perhaps impracticable.

In a large number of cases equally perfect results may be got with a mixture of new amalgam with old that has been heated to its softening point, and a beautiful finish can at once be got upon the plugs.

PREPARATION OF AMALGAM.

Dr. Benj. Lord is quoted as saying:

To a teaspoonful of hydrochloric acid add a pint of water. Pour a sufficient quantity in a wedgewood mortar, add the alloy, stir with pestle; add the mercury and amalgamate. Then wash in clear water; all the black oxide will be cleansed from each particle of the alloy; the amalgam will act quicker and stronger and will discolor less.

CARRYING CEMENT TO CAVITIES.

DR. C. R. TAYLOR, STREATOR, ILL.

Dental Digest, February.

To avoid the sticking of cement to the instrument and the smearing of it all over the cavity, where it is desirable to place it over a pulp, or to cover the floor of a cavity, cut a piece of letter paper to fit the cavity, place the cement on the piece of paper, catch the edge of the paper with pliers, and carry it to the cavity and press down with a burnisher.

MIXING CEMENT.

Ohio Dental Journal, February.

For mixing cements, Dr. Ames says he uses a large stiff spatula and a large mixing surface. The mix is made as stiff as can be on the slab, adding powder gradually, and rubbing very energetically; then it is taken between the thumb and fingers and kneaded, incorporating more powder as long as the mass tends to become soft or sticky.

USING OXYPHOSPHATE CEMENT.

Dr. Gray says brush around a cavity with a little chloroform and oxyphosphate will stick to the tooth all right. If you smear the walls of the cavity with the liquid that comes with the cement, you will get absolute union between the cement and the wall of the cavity. He uses it this way in setting crowns.

OXYPHOSPHATE OF COPPER.

Dental Review, June.

This cement was introduced several years ago by Dr. W. V. B. Ames of Chicago. Dr. C. N. Johnson writes very enthusiastically about it. It is very black, and cannot be used anywhere near the front of the mouth. After the cement has been thoroughly mixed and carried to its place, it should not be disturbed in any way by manipulation, until it becomes reasonably hard. Immediately after insertion, a blast of hot air may be directed against it, followed, as soon as stiffening begins, by a stream of hot water, which should be continued till crystallization is quite complete. The filling may then be trimmed to form, in the usual way.

Success may not crown the first few efforts with this cement, but Dr. Johnson is enthusiastic enough to urge repeated efforts.

PLACING DAM ON LOWER FRONT TEETH.

DR. J. G. TEMPLETON, PITTSBURG.

Dental Review, December.

A slip noose can be put on the lower front teeth with one hand, while the rubber dam is held down with the other; get the slip knots ready first, draw them tight, and they will hold as long as wanted.

BROCKWAY NEEDLE DAM RETRACTOR.

Dental Office and Laboratory, March.

Fig. 1 represents the needle bent as he indicates, as well as showing the drop of shellac melted on the eye of the needle in order to better engage the rubber dam. To bend the needle in the form of the letter S as he indicates, the eye part of the needle should be heated, otherwise in the attempt to bend it would snap. But it is important that the temper should not be taken out of the point of the needle. To do this the point of the needle should be held between a pair of flat nose pliers, and while thus held the eye part heated in order to facilitate the bending.

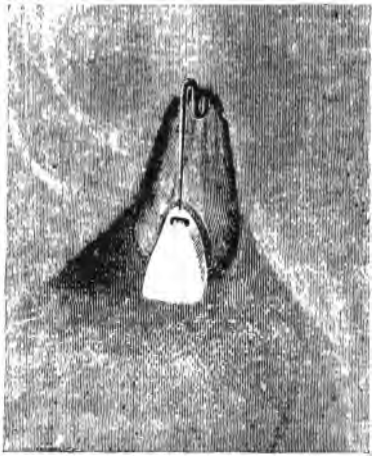


FIG. 1.

After the cavity is prepared, the rubber dam is applied, and the rubber dam strap placed around the head, and the dam seized on each side next the cheeks. With the fingers, the dam is lifted away from the cavity and the point of the needle pressed firmly into the tooth just above the upper border of the cavity. The needle should point downwards with the shellacked bead pointing towards the nose and near the gums or lip. That part of the dam which lies on the lip is then lifted and slightly stretched, not so much however as to loosen it from the tooth, but enough to let it hold to the shellac bead. This is shown by Fig. 2.

Dr. Brockway says it may wriggle about but it will not slip. He holds it important that the point of the needle be well and firmly pressed into the tooth above the border of the cavity.

[It has been difficult to understand this device, until the above journal illustrated it.—ED. COMPENDIUM.]

REMOVING EXCESS OF MERCURY FROM AMALGAM FILLINGS.

DR. E. C. KIRK, PHILADELPHIA.

International Dental Journal, April.

In speaking on the principles relating to amalgam, he says the best way to remove the excess of mercury from the filling is to absorb it from the surface of the filling by means of crystal or sponge gold. The amalgam mass, after crystallization has fully commenced, should be squeezed in chamois until an easily workable mass is produced. The amalgam is then introduced into the cavity of decay and the filling built more than flush or full contour. Pellets of freshly annealed sponge gold are then rubbed into close contact with the amalgam surface by suitably-shaped instruments. This process is continued as long as any whitening of the gold will take place by contact with the filling. When no more mercury can be extracted in this way, the filling may be carefully burnished, and in a very short time--depending more or less upon the kind of alloy used—may be given a final polish.

ARCH OR SPAN FILLINGS.

DR. W. A. MILLS, BALTIMORE.

Ohio Dental Journal, August.

The writer describes his method as follows:

Take for example two superior bicuspids which have space the sixteenth of an inch between them, and have cavities on the proximal surfaces; otherwise he would make them. Prepare cavities as though they were to be filled separately. Be sure to make the anchorage as strong as possible, as they become the abutments of the arch when completed. Set an orange-wood wedge firmly between the teeth. Bind teeth firmly together with German silver wire, to prevent any spreading during the packing of the filling material. Fill the space with oxyphosphate mixed rather stiff, forcing sufficient cement over and against the buccal and palatine surfaces of the teeth to form a matrix. Before the cement

sets too hard remove it from cavities in the teeth, and a sufficient amount of the space to give proper form to the arch, buccal and lingual surfaces of the filling; then proceed to fill as though it were a single cavity. When filling is completed, remove rubber dam, matrix wedge, and binding wire, then polish.

With an amalgam filling the same process is used, except that gutta-percha is employed in place of the oxyphosphate, and this and the binding wire are not to be removed until twenty-four hours afterwards, when the fillings can be dressed. The plan is recommended only where necessity calls for it.

ANCHORAGE FOR LARGE CONTOUR FILLINGS IN INCISORS.

DR. C. N. JOHNSON, CHICAGO.

Dental Review, October.

From observation, it would seem that the majority of operators prepare the cavity in the following manner: After the usual conformation is given the cervical portion of the cavity, anchorage for the occlusal half of the filling is obtained by drilling obliquely into the cavity toward the occlusal surface between the two plates of enamel as they come together. Anchorage of this form frequently develops a weakness which results in a loosening of the filling, as follows: The gold which is built into the occlusal undercut becomes slightly battered or compressed as the result of force exerted on the end of the filling, and the whole filling is thus allowed to tip away from the cavity, leaving a seam or space between the filling and tooth. In some cases a filling will remain partially dislodged in this manner for a considerable time without perceptible loosening, while in others the filling is forced bodily out of the cavity shortly after its insertion. It will readily be seen that any compression of the gold in the act of biting upon it will lift it away from its close adaptation to the occlusal undercut and result in a leakage of the filling, if not in a total dislodgment. So many cases of failure from this cause have been noted, and so many inquiries as to a surer method of anchoring these fill-

ings firmly in place have recently been made of the essayist, that he has been induced to prepare a short paper embodying his views on the subject.

Possibly a clearer idea of the method to be described may be gained by taking a typical cavity and outlining its preparation than by speaking in a general way of the process. Let us suppose we have a large mesial cavity on a left upper central incisor. There is little penetration of the decay toward the pulp, but the entire mesioocclusal angle of the tooth is gone. This form of cavity apparently presents greater difficulties to the average operator than where the decay has penetrated deeper. In the present method of preparation the cervical half of the cavity is shaped in the usual way, being liberally extended cervico-labially and cervico-lingually. To obtain anchorage at the occlusal portion of the filling, instead of drilling into the axial wall in the ordinary manner, a groove is cut along the occlusal surface leading from the cavity distally to near the distoocclusal angle. This groove must be made sufficiently wide and deep to admit of a large enough mass of gold being packed into it to insure strength, and in order to accomplish this in teeth with thin occlusal surfaces, it is often necessary to cut away the lingual plate of enamel somewhat freely. This may be done with safety, provided the enamel margins are properly beveled and gold built over them in the insertion of the filling. The distal end of the groove may be deepened somewhat to assist in retention. The philosophy of this form of anchorage consists in two things: First, it will prevent absolutely the tipping of the filling previously alluded to; and second, it increases materially the seating capacity of the filling. Since the appearance of Dr. Black's articles on the compressibility of filling materials and kindred studies, the seating area of our cavities becomes a matter of much importance, and it seems quite conclusively proved that, other things being equal, the larger the area upon which the filling rests to sustain it in the force of mastication, the greater security it has against dislodgment. With the form of anchorage just outlined it becomes impossible for a filling to get out of a cavity short of a breakage, and if the mass of gold is made thick enough it will not break. It is readily seen that the greater the force brought to bear upon the filling in the closure of the teeth, the firmer it is driven into the cavity, and if

there should be any compressibility of the filling material the tendency would be toward a closer adaptation to the cavity walls instead of a lifting away, as in the ordinary method of anchorage.

At first glance there might appear to be several objections to this method. Some operators may feel a hesitancy about drilling into sound tissue in this way for anchorage, but it must be remembered that in the preparation of any cavity sound tissue is often sacrificed for this purpose. In this instance it is sacrificed to good account, and when the operation has once been done in this manner the operator will to a large degree find his hesitancy gone. There is a feeling of security when the gold has been built well over and anchored into the occlusal surface that does not obtain in any other kind of cavity formation for this class of fillings. Another objection might seem to rise in the apparently unprotected labial plate of enamel. The labial plate is always left standing for appearance, even when the lingual plate must be cut away for strength, and if not properly protected might prove an element of weakness. But by carefully beveling the enamel margin and building gold over the bevel, it is so perfectly protected that in all my experience with this method I cannot recall a single instance where this wall has failed. The acute corner at the mesioocclusal angle should be rounded slightly, and the same corner on the lingual plate should be cut freely away so that the outline of the filling is a gentle curve from the proximate to the occlusal surface.

This form of filling provides an adequate protection for the end of the tooth, and does away with what is ordinarily a vulnerable point in most fillings of this class when constructed in the usual way—viz., the junction between gold and enamel at the occlusal surface. The slightest chipping away of the enamel at this point is often disastrous, and results in final destruction of the filling. Again, there is opportunity for deeper and firmer anchorage without danger of approaching the pulp than where an undercut is drilled into the axial wall. The cavity is rendered freer of access for the insertion of the filling, and while more gold is used, it is more readily inserted and is hidden from anterior view by the labial plate of enamel. A filling of this form, therefore, looks no more conspicuous in front than where the occlusal surface is left intact.

ANCHORING FILLINGS IN INCISORS.

DR. H. A. CROSS.

Dental Review, November.

The cuts illustrating the writer's method hardly need an explanation.

He says take a case where the occlusal corner of the tooth is decayed or is broken away, extending well up toward the cervical portion, as is common in such cases. A dovetail groove is cut across the lingual plate of enamel about midway, enlarging the groove a little at end farthest from the side of the crown to be reproduced with gold, having prepared the cervical portion of the cavity, and by beveling the occlusal corners of the enamel plates, gives very firm anchorage, also abundant seating capacity.

It often happens in cases under consideration that there is a proximal cavity in the opposite side of the same tooth, in which case the groove is extended entirely across the lingual enamel plate, connecting it with the other cavity, so that when the gold is condensed in both cavities and through the connecting groove the whole mass is so firmly bound and locked together that dislodgment of either portion is next to impossible, while the connecting band is not visible.

COPPER AMALGAM AND CEMENT FILLING.

Dental Cosmos, August.

Dr. Straw says an excellent filling is made by powdering Weygandt's copper amalgam very fine, mixing with oxyphosphate in equal parts; add the liquid as in ordinary cement filling, place in the tooth, let it harden for half hour, then polish.

FINISHING GOLD FILLINGS.

Dental Cosmos, April.

Dr. F. B. Darby, Elmira, N. Y., says flour pumice applied on buff leather polishers, the engine running very slowly, makes the modest, soft, velvet-like finish that is desirable.

He gets the flour of pumice by stirring ordinary fine pumice in water, and allowing the bulk to settle, after which pour off the milky water into a shallow dish and allow the water to evaporate.

INSERTING GOLD FILLINGS WITH HAND BURNISHERS.

DR. H. F. LIBBY, BOSTON.

International Dental Journal, June.

The author of this method has been perfecting his system for seventeen years. It seems that he has given to the profession something of tangible value, in the way of filling teeth with gold.

It is difficult to detail a method of filling teeth, without numerous drawings, which the author has not made. His instruments are hand burnishers, with short shanks and stout handles of wood, which give lightness, with leverage.

In filling a posterior approximal cavity of an upper bicuspid, he uses crystalline surface soft gold foil, No. 4, each sheet cut into thirds and rolled into rope form, between the thumb and fingers; this is packed on each side and keyed in the center; it is condensed with a properly shaped burnisher slightly serrated.

On this base annealed foil is added, the grooves and undercuts are filled and the contour made. The stroke of the instruments on the gold is more of a rotary than a sliding motion.

His instruments are thirteen in number, and are shaped so as to reach any point in a cavity.

Photo-micrography of fillings made in an ivory matrix, with the different processes of filling, showed the burnished filling to have very many less pits and imperfections than the others.

TO MAKE VENT HOLES IN TEMPORARY FILLING.

If it is desirable to make vent holes through a temporary filling into roots being treated, place a piece of small wire or wooden pegs into the roots, fill with the stopping and withdraw the wire. The wire is to be left long enough to be grasped for removal.

FILLING TEMPORARY TEETH.

Dr. J. Y. Crawford says very satisfactory results are obtained where the approximal cavities in molars are large, after excavating, to fold a strip of dam and pass it between the teeth, fill the cavities with cement and while it is soft, sink a piece of wire (German silver will do) into the cement to reach across from one filling to the other. After the cement hardens, remove the strip of dam and finish filling.

TESTING OLD FILLINGS FOR LEAKS.

DR. GEO. S. ALLAN, NEW YORK.

Pacific Coast Dentist, April.

The writer says the ethereal preparations of hydrogen-dioxide will tell many a story of defective adaptation of filling-material to the walls of cavities. Many times, when patching old fillings, the eye fails to detect trouble until the forming of gas around the defective margins points it out; especially has this been found to be the case in old amalgam fillings. It is both safe and wise to make this test in all doubtful cases.

TO REMOVE, SURGICALLY, OVERHANGING GUMS.

With a sharp lancet cut away the overhanging gum; touch the cut edges with carbolic acid. If there is still a tendency to bleed, heat a round-headed burnisher and cauterize the surface.

TO APPLY HEAT TO A TOOTH.

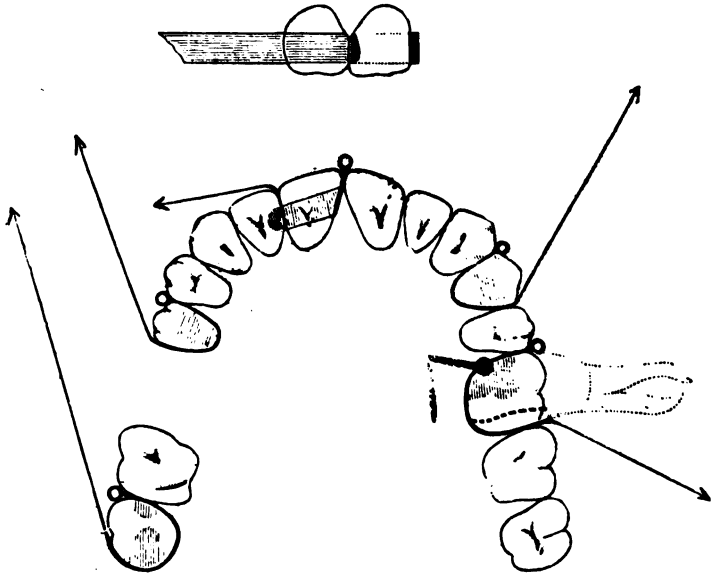
To apply heat to a tooth for diagnosis of pulp trouble, make a disk of base plate gutta-percha, heat it, dry the tooth, and apply it.

GERMAN SILVER MATRICES.

DR. G. A. BRONSON, ST. LOUIS, MO.

Dental Digest, June.

The accompanying cut illustrates the great assistance to be derived from a German silver strip matrix in filling all proximal cavities in either jaw, presenting on the buccal, lingual, or grinding surfaces, from the third molar on one side to the corresponding tooth on the opposite side.



A piece of German silver is rolled to No. 36 gauge, and cut in strips averaging 3–16 wide and six inches in length. The end intended for the teeth is rolled upon itself to a coil of 1–16 inch in diameter, and the other end to a coil of 3–16 to hold on by, or what is still better, soldered to a ring to slip the finger in. Both coils should be filled with soft solder.

This form of matrix is especially useful for a number of diffi-

cult cases, where the older forms were lacking, such as the disto-lingual surface of a third molar, a proximal cavity where the adjoining tooth is lacking, etc. It is most useful for all plastic fillings, but at times comes in very well in operating with gold. It is quickly adjusted and removed, and owing to its extreme flexibility, its removal is less liable to disturb a new-made plastic filling than the ordinary form of matrices. The end with the large coil or ring is held taut by the operator or assistant.

Beginning with the right third molar, the cut shows a disto-palatine cavity for which the strip matrix can be adjusted in less time than it would take to only measure the tooth for a band to be soldered and adjusted, besides leaving no band to be cut open after the filling is inserted. The third molar also shows a simple anterior proximal cavity. The second right bicuspid shows the method of restoring palatine cusp; if the buccal cusp were missing it would be equally useful. The lateral shows a cavity opening on the palatine surface and not involving the buccal to any extent.

The small cut illustrates a cavity opening on the buccal surface, and on removing the strip a sufficient space will be left to finish the cavity with strips. The strip as adjusted to left first bicuspid illustrates its use for three fillings in one operation, and were the second bicuspid missing, a difficult position for adjustment of the ordinary matrix, its usefulness would not be impaired in the least. The first molar shows two cavities very difficult of adjustment for the ordinary matrix, especially the large distal cavity, not involving the grinding surface but presenting on both the palatine and buccal surfaces. When the opening on the palatine surface is larger than on the buccal, the strip is reversed and the filling inserted from the palatine side.

TO EXTRACT BADLY DECAYED MOLARS.

Items of Interest, August.

Dr. S. Thomas, Somerset, O., says divide the roots on a line between the palatal and buccal roots, using a large size spear-pointed fissure drill, and then insert one beak of the forcep in the place drilled.

EXTRACTING IMPACTED THIRD MOLARS.

Dental Review, June.

In a discussion on this subject, Dr. A. W. Harlan reports a case of a third molar projecting against the second molar, with crown almost imbedded in roots of second molar. The gum was thoroughly removed from over the molar, the nerve was destroyed, the tooth cut in two and the roots taken out separately.

He says, that in case the mouth cannot be opened sufficiently to remove the overlying gum with an instrument, it can be removed by the application of trichloracetic acid.

DEVICE FOR ELEVATING UNERUPTED OR IMPACTED LOWER THIRD MOLARS.

DR. J. W. FOREMAN, ASHEVILLE, N. C.

International Dental Journal, August.

The appliance used in dealing with this case is shown in Fig. 2. It is a vulcanite cap to cover the two molars and second bicuspid, with a gold arm bent so as to project over the tooth to be lifted, and as far above it as the upper jaw will permit. The remainder of the apparatus consisted of a gold-wire staple with the ends bent the second time so as to form an inclosed, long link, the ends of which were pinched together into holes drilled in the buccal and lingual sides of the tooth, and a piece of rubber tubing to connect this staple with the projecting arm of the cap.

FIG. 1. FIG. 2.

The idea was first to get the force from a screw, but it was found that the patient could not manage that, and the elastic was substituted. The cap was removed, cleaned, and replaced once a day by the patient.

This tooth was placed horizontally, the grinding surface impinging upon the distal root of the second molar; the distal surface, the only part uncovered, less than one-fourth of the circumference of the tooth. The gum had to be cut away on both sides

to get low enough down to drill the holes, the discolored part between the holes being all that was exposed. Fig. 1 shows tooth, staple, and elastic.

Ten days sufficed to lift the tooth enough to permit fairly easy extraction.

APPLICATION OF ARSENIOUS ACID TO PULP.

DR. T. J. BORLAND, MILWAUKEE, WIS.

Dental Review, September.

In applying arsenical treatments, adjust the rubber dam first of all; thoroughly cleanse the cavity of all débris; dry with warm air, not hot; apply a small pellet of cotton and oil of cloves or wine of opium, leaving for one or two minutes; remove and dry again. Puncture the pulp, which procedure will at this point cause no appreciable pain. Wipe away the drop of blood; apply directly to point of exposure an amount of arsenious acid that may be taken up on the point of a fine, smooth broach. Now saturate a pellet of cotton with carbolic acid or oil of cloves, place thereon $\frac{1}{8}$ to $\frac{1}{4}$ grain of acetate of morphia, and lay carefully over the treatment; mix some oxyphosphate cement thin and flow into cavity, which if carefully done will avoid all pressure, and effectually seal the margins. The patient is not dismissed until the cement has hardened and care taken to see that occlusion is not interfered with by the temporary stopping.

It is rare that the patient returns with an unbearable ache, and the treatment may be applied at first sitting, although there may be a marked pulpitis. The application should remain forty-eight hours in adult cases. In persons from twelve to twenty-one years of age, twenty-four hours; under twelve years of age it will be found sufficient to apply in the evening and remove in the morning. When the treatment has been removed cut out the bulbous portion of the pulp with a bur in order to bleed it well; dry, and apply pellet of cotton saturated with carbolic acid which will complete the work of devitalization. Cover with temporary stopping and allow to remain seven or eight days, at the end of which time the pulp may be extracted devoid of pain and without hemorrhage.

DESTROYING PULPS OF AND FILLING TEMPORARY TEETH.

DR. N. A. STANLEY, NEW BEDFORD, MASS.

International Dental Journal, January.

For destroying the pulp, the writer uses arsenious acid, a very small quantity, allowing it to remain a few hours. His method of filling, after destroying and removing the pulp, is to syringe out the cavity with warm water and treat with three per cent. pyrozone, then apply dressing of cotton and iodoform to the pulp cavity and fill immediately over it.

PULP DESTRUCTION AND REMOVAL.

DR. C. N. JOHNSON, CHICAGO.

Trans. New Jersey Society.

The method of using cobalt is as follows: After complete exposure of the pulp is gained, a small pellet of cotton, less than the size of the head of a pin, is moistened slightly in one of the essential oils and carefully dipped into the cobalt. The moist cotton will pick up a minute quantity of cobalt, which is then carried to the cavity, and the cotton and cobalt placed immediately on the exposed pulp. Meanwhile the assistant has been mixing some oxyphosphate cement. This is flowed over the cotton to perfectly seal the cobalt in the cavity, great care being taken not to cause pressure on the pulp. In nearly every case of pulp-destruction, cement is used as the sealing agent in preference to gutta-percha. Cement admits of greater certainty of adaptation to the cavity walls, with less danger of pressure, and it has long been recognized that much of the pain occasioned in pulp-destruction is due to pressure.

It has for several years been the writer's custom, where molars and bicuspids have been under treatment, to allow cobalt to remain sealed in the cavity one week. The precaution is taken in anterior teeth to remove the cobalt in twenty-four hours, through fear of discoloration, though my experience with cobalt would lead me to be less fearful of discoloration in its use than with arsenious acid.

It seems to interfere much less with the circulation in the pulp, and would therefore not be likely to cause the extensive disruption of red blood-corpuscles and the infiltration of the coloring matter through the tooth that we sometimes see where arsenious acid has been allowed to remain too long in a cavity. When the cement has been removed from an anterior tooth the cobalt is washed out of the cavity with one of the essential oils, the cavity dried, and a pellet of cotton saturated with the oil is applied for one week. This is again sealed in with cement, and in this connection I wish to emphasize the necessity for using cement as the sealing agent in the treatment of anterior teeth from the time they come under the operator's care till they are permanently filled. Hermetical sealing cannot always be easily accomplished with gutta-percha, and many a case of bad discoloration may be traced to leakage of the sealing agent during the process of treatment. This fact, together with others of equal importance, argues for an application of the rubber-dam in the management of pulpless teeth in all cases where there is not absolute certainty of dryness without it.

In those cases which are most difficult to manage in this respect—deep approximal cavities where the form of the gingival wall results in a sharp incline from the pulp-exposure rootwise toward the gum-tissue in the interdental space—the gum is protected in advance of the application. If this precaution be not taken, the tendency is for the devitalizing agent to be forced down into the interdental space by the application of the sealing agent. The method of protecting the gum is by building a barrier of Gilbert's temporary stopping over the interdental space, reaching from the approximal surface of the adjacent tooth over the gum-septum and along the gingival wall of the cavity to near the point of pulp-exposure. Good adaptation to the gingival wall may be gained with Gilbert's stopping, not only on account of the pressure which is permissible against this wall, but because the preparation gets very soft and adherent with little heat. When the gum is protected by this bridge, the application of cobalt is made and sealed in position with cement. The latter becomes firm and rigid, preventing any dislodgment in mastication, which might occur if the temporary stopping were used throughout.

The objects gained by leaving the devitalizing agent in a week are mainly two. The destruction of the pulp seems to be more com-

plete when this is done, and the plan saves the time and expense, both to operator and patient, of an extra sitting. Seldom is a pulp in a condition to be readily removed after the application has been in twenty-four or even forty-eight hours, but it usually is at the end of a week. Thus when the agent is removed in twenty-four hours, the cavity must be resealed and the patient given a subsequent sitting for the removal of the pulp.

At the second sitting the rubber-dam is applied, the cement removed, and the cobalt washed out by flooding the cavity with absolute alcohol. This is then evaporated with the chip-blower till the cavity is dry, when a sharp bur is used to thoroughly open up the pulp-chamber. In doing this, the bur usually lacerates and cuts into shreds the main body of the pulp contained in the chamber, and this, together with the débris from the bur, is again washed out with alcohol. The openings of the canals can readily be discerned by evaporating the alcohol to dryness, and in passing I may say that the most efficient means of discovering hidden openings of small or badly situated canals under any circumstances is to flood the pulp-chamber with alcohol and use the air-blast till the chamber is quite dry. The alcohol will usually wash out any debris that may be plugging an opening in the case of pulps long dead, and in any event will at once disclose the position of the opening by the difference in color between the debris and tooth-tissue when dry.

After the bulbous portion of the pulp is removed, the extraction of the portion in the canals may be facilitated by first absorbing as perfectly as possible the moisture from the remaining pulp-tissue. Alcohol, on account of its affinity for water, aids materially in this, and I have recently been employing it in the form of spray for this purpose, and also for drying pulp-canals previous to filling. The kind of apparatus used for producing the spray is one of the many devised for obtunding sensitive dentine, and was invented by Dr. Rust of Chicago. I have found greater use for it in pulpless teeth than in sensitive teeth. It will usually be found where pulps are moist and tear easily with the broach without readily coming away from the canal, that if dried in this way they will become tougher in fiber, smaller in caliber, and can be easily removed. Again, in those occasional cases where the pulp-tissue is sensitive to the pressure of the broach, even after the application of the most

powerful devitalizing agents, we may control the difficulty in the same way. Pulps in this condition are never sensitive to the application of the spray, and in fact the most extreme changes of temperature do not seem to affect them in the least, no matter how sensitive they may be to the touch of the broach. Let such pulps be thoroughly desiccated by the use of alcohol as before mentioned, and it will be found that all sensation will be gone and the pulps in condition to be removed painlessly.

After the extraction of the pulp the canal is flooded with an antiseptic to destroy any putrefactive germs which may in one way or another have gained entrance to the canal. This is wiped out as perfectly as may be with absorbent cotton on a broach, and the canal again flooded with alcohol, which is in turn evaporated with the spray apparatus. When the canal is sufficiently dry it is filled.

REMOVING DEVITALIZED PULPS.

Dental Digest, March.

Take a watchmaker's pivot broach, known as the Swiss broach, anneal it, wind a few shreds of cotton around the end, push it into the pulp cavity and slowly twist it. As the cotton is wound around the broach, the pulp will cling to the cotton, and thus will be taken out whole, without the danger of breakage usually accompanying the use of barbed broaches. It is not necessary to carry the instrument to the end of the root, but some cotton should be forced ahead of the broach before twisting it.

FOR HEMORRHAGE AFTER PULP EXTRACTION.

Dr. Edward Eggleston, Richmond, Va., says for hemorrhage after pulp extraction, there is nothing better than pyrozone, either five or twenty-five per cent. It may be applied on cotton in the root.

MUMMIFYING PULPS.

THEO. SODERBERG, SYDNEY, AUSTRALIA.

Dental Cosmos, November.

After the pulp has been perfectly devitalized by using arsenic, cocain and alum, equal parts, with glycerol to make paste, open up the pulp chamber and drill out its dead contents, leaving the root canals untouched. Fill the chamber with paste composed of alum, thymol, glycerol, equal parts, and zinc oxide to make stiff paste With broach prick the paste into the pulps left in the canals, seal over with cement and fill with amalgam or gold.

PULP PROTECTION.

Lay on the floor of the cavity a piece of court plaster with the adhesive side to the bottom; over this flow cement.

Another method. Place Canada balsam on the floor of the cavity and on this thin asbestos paper.

Another method is to varnish the floor of the cavity with sandarach and lay over this a piece of thick letter paper, then flow over all cement.

PULP PROTECTION.

Dental Cosmos, November.

In speaking of pulp protection, Dr. J. D. Patterson says in deep cavities nothing is better than gutta-percha covered with cement; but in cavities too shallow for gutta-percha, the best protection is had by placing several layers of non-cohesive gold on the floor of the cavity and then filling with cohesive gold. He says the philosophy of the difference between the two forms is that the non-cohesive filling is in no way a cohesive mass, and the thermal shock is conducted along the layers and not down to the bottom of the cavity, while the cohesive filling has the conductivity of cast gold. He has thus been led to believe that the non-cohesive gold is an admirable pulp-protector. A pad of sufficient thickness,

made by doubling strips upon one another and burnished over the pulp, has secured the best of results. It is everywhere applicable, and the filling may be finished with cohesive gold, amalgam, or cement, as desired.

PULP PROTECTION.

DR. W. STORER HOW, PHILADELPHIA.

Dental Cosmos, April.

In a carious tooth the floor of the cavity sometimes has a place or point where the wall of the pulp-chamber or canal has but a thin septum between it and the cavity-floor, and the problem is one of pulp-protection from thermal shock or irritation. To the various well-known capping or non-conductive methods of procedure I desire to add an alternative one, which consists simply in the interposition of a disk of rubber-dam. The material is always at hand, and with proper punches suitable sizes of disks may be quickly made and kept in readiness. By folding a piece of dam in sextant shape, and with the scissors snipping off the point, an impromptu disk may be made to suit the cases. For example, cut two such disks. Having the cavity formed and dried for filling, the cavity-floor and walls are to be lightly touched with a very little ball of cotton, carrying about a quarter of a drop of pure mastic varnish or other cavity-lining. Then touching the cotton ball with the end of a curved canal broach, pick up the little disk and delicately cover the cavity-floor, to which the disk will stick; mix some cement, suitably soft; put a little on the center of the second disk, lift it with a pair of fine-pointed foil-tweezers and gently place its cement side against the other disk, and with a ball burnisher softly spread the cement under the second disk to completely cover the cavity-floor and partly cover the cavity-walls. Allowing some minutes for the setting of the cement, the remaining area of the cavity can be filled with whatever material may be preferred. The pulp will be doubly protected by the two rubber disks. The larger round disks may, with the scissors, be readily given oval or other shapes to suit special cases.

Of course, similar thin gutta-percha or paraffin-paper disks may be thus used, as may also disks of vulcanizable rubber, and a

disk of celluloid or mica is every way preferable to one of metal, even though that be lead.

In filling a cavity wholly with cement, it is a good plan to place some of the mass in the cavity, and follow with a rubber disk, which, when pressed around with a ball burnisher, will carry the sticky cement against the cavity-walls without liability to be drawn back, as may be the case when some of the cement sticks to and is pulled out with the plugger; whereas, in the present instance, the ball moves freely over the surface of the disk, which is soft and stretches easily under the ball, which comes readily away to permit the completion of the filling as usual. Incidentally, it is worth while to say in this connection that an oiled mica matrix, by virtue of its extreme thinness, smoothness, flexibleness, resistance to acid actions and shapability with scissors, to say nothing of its cheapness, leaves little to be desired in the way of a readily applied and removed cavity-wall. It may be ligated or otherwise secured around the tooth; as, for example, by heat-softened gutta-percha pressed against it on either side between the teeth. With due care in adjusting the matrix, no subsequent finish will be required.

The elasticity of the mica matrix suggests discretion to avoid its accidentally springing into the mouth, and its friability renders caution requisite to prevent the leaving of broken pieces between the teeth. Of course when the rubber-dam is in position, neither of these considerations will be in point.

PULP REMOVAL.

Dental Cosmos, April.

The painless removal of live pulps is always an interesting question. Dr. Boswell says he succeeds well by using crystal carbolic acid. A crystal is placed in the pulp canal, and with a broach it is worked into the canal. He says there is very little pain after the acid touches the pulp.

PULPITIS.

Pulpitis can often be relieved by syringing the cavity with warm bicarbonate soda water.

PULPITIS.

Dental Review, February.

An application of equal parts of tincture of aconite and carbolic acid to the pulp, says Dr. M. R. Harned, will relieve almost instantly the pain caused by arsenious acid. The arsenic must, of course, be removed before applying the remedy.

PULPITIS FROM ARSENICAL APPLICATION.

DR. L. C. LEROY, NEW YORK.

Dental Cosmos, December.

The writer says, for pulpitis from the use of arsenious acid, nothing is better than a ten per cent. solution of cocaine. To apply the arsenic, it should be placed at a point remote from the exposure of the pulp.

PULPITIS TREATMENT.

Dr. Kirk says almost instantaneous relief is to be had by the application of thymol, either powdered or a saturated solution in chloroform.

AMPUTATION OF ROOTS.

This is an operation that should be performed more often, where the treatment of badly diseased roots is concerned. Frequently, molars with a necrosed root can be made serviceable by having such a member removed.

Buccal and palatal roots are often seen denuded of both gum and osseous tissue, exposing the bifurcation, and are traps for food, causing stench. The removal of such roots is not only a benefit but a necessity.

The operation is not a difficult one to perform. Generally it can be done with a small bur or corundum wheel.

CLEANSING ROOT CANALS.

Dental Review, December.

Dr. Harlan suggests the washing out of root canals before treating antiseptically (with myrtol, for instance) with diluted stronger liquid ammonia to about one-half of one per cent. Dry the canal and introduce the dressing. It is a cleanser.

DRILLING THROUGH THE APEX OF ROOTS.

A writer in the Stomatological Gazette, August, says Dr. Atkinson taught that it was safe practice to bore through the apex of a pulpless tooth without fistulous opening, and draw blood. That harm need not be feared.

TO DRY ROOT CANALS.

Make a copper point to fit the canal and long enough to project one-fourth of an inch from the orifice. Heat a copper ball, which should be attached to a handle, and apply it to the copper point.

FILLING ROOT CANALS.

DR. GEORGE H. CUSHING, CHICAGO.

The root canals being presumably thoroughly cleansed of pulp tissue, and aseptic, and the dam in place—the canals are dried and cones of gutta-percha selected or shaped to fit each; they are passed into the canals as near to the apex as possible, and marked as to their length, then withdrawn and cut off.

Dissolved gutta-percha, of the consistency of thick cream, is then carefully pumped into all the canals, the excess being wiped out of the pulp chamber. The cones are then introduced as far as possible, with fine-pointed pliers, and pressed completely to place with a plugger point until sensation is felt by the patient.

Other cones are then placed beside the first until the canals are filled; a small piece of Hill's stopping is then introduced and the packing in the canals is completed with heated, root-canal pluggers.

Where the canals are too small to admit of a cone of gutta-percha, gold wire is filed down to fit them and used instead of the gutta-percha cones.

ROOT-CANAL FILLING.

DR. S. G. PERRY, NEW YORK.

International Dental Journal, September.

It is the practice of Dr. Perry to obtain direct access to the roots of teeth by drilling tap-holes through the crowns, either where the cavity of decay does not open them directly, or where the teeth are sound, but with dead pulps. He says, in considering sound teeth that have dead pulps, we have only to regard the fissures in the crowns, and to remember the anatomy of the roots, in order to know exactly where to drill. No mention need be made of the superior and inferior incisors, further than to say that, as a matter of course, they are to be drilled on their lingual sides, and at such angles as will give access to their canals in nearly a straight line. The first inferior bicuspid must be drilled through the small anterior crown fissure; the second bicuspid through the anterior division of its single irregular fissure. The first lower molar, not through the deep fissure near the middle of the crown, but just anteriorly to it, so that the tap-hole will come nearly over the anterior root. The tap-hole should then be reamed posteriorly to give access to the posterior root. The backward slant of this root is such that nothing more is needed to give direct access to its canal.

Then, substituting a right-angle hand-piece, the same tap-hole should be reamed towards the buccal and lingual sides of the tooth, and this will open up the two canals in the anterior root, so that nearly straight instruments can be passed to their extremities. The inferior second molar should be entered just anteriorly of the deep middle fissure, so that the anterior root can be entered in nearly a straight line. A little reaming posteriorly will give access to the

posterior root, as in the case of the first molar. The lower third molar should be entered, also, just a trifle in front of the center of the crown. The superior first bicuspid should be entered through the anterior depression of the fissure. This will give direct access to the two roots, if they exist. The second superior bicuspid, of course, through the fissure in the center of the crown. The superior first molar should be entered through the anterior deep fissure, and the tap-hole reamed towards the palatine and buccal roots. The superior second molar should be entered through the anterior fissure in the same way. The superior third molar should be entered from the anterior edge of its irregular fissure. The size of these tap-holes must vary with the different teeth. They must be as small as possible, in order not to weaken the teeth; but, on the other hand, they must be large enough to allow the entrance of light, and to give a chance for accurate work.

One naturally shrinks from drilling a hole in a sound tooth, but it is a necessary means to an end, and the patient had better have a weakened tooth with healthful roots than diseased roots and a sound, strong tooth.

Thus far he has assumed the absence of cavities. If they occur in the center of the crowns, or on the anterior approximal surfaces of the molars and bicuspids of either jaw, tap-holes may not be necessary; but if they occur on the posterior approximal surfaces of these teeth, and are not very large, tap-holes are indispensable. If they are not considered so for the use of the instruments generally employed for cleaning and filling the roots, they certainly are for the use of the instruments described. A large cavity in the posterior surface of a lower molar may give direct access to the posterior root. In that event the tap-hole can be drilled more directly over the anterior root. In such cases he has many times drilled two small holes over the front root, one over each canal, throwing the light by reflection through the cavity of decay. In the same manner a large cavity on the posterior surface of the superior molar may give direct access to the palatine root, and two tap-holes, one over each of the buccal roots, will give direct access to their canals. Often the tooth substance between these two tap-holes can be cut away with a fissure-bur, leaving a slot through which work is facilitated, and without much weaken-

ing of the tooth. This slot will be nearly half-way between the bottom of the deep fissure and the tips of the buccal cusps. In this case, also, light by reflection can be afforded through the cavity of decay, and the tap-holes can be very small and the slot very narrow.

If these large cavities on the posterior surfaces of molars do not quite give direct access to the posterior or palatine roots, a fissure-bur readily cuts a groove in the grinding-surface edge of the cavity, and a tapered root-canal reamer, revolved on the posterior side of the opening into the canals, opens up the root so that a straight broach wrapped with cotton can be rotated in it, and this rotation may be essential to its thorough cleansing. The reamers used for this purpose are never used, except for opening the orifices of root-canals. They have a very gradual taper, so that no shoulder or irregularity of surface is left, as often occurs with the reamers generally in use. Cutting, as they do, on their sides, they are very dangerous instruments to use deep in the roots, and their use is therefore restricted to opening the orifices of the canals. He never uses any of the means employed for enlarging the canals, except at their orifices, as described.

For removing freshly devitalized pulps, he will use a barbed broach, but never when the pulp has been for some time dead. He prefers the Swiss broach used by jewelers, with the temper drawn. This he accomplishes by placing them in a glass tube and drawing the color to a deep blue. With shreds of cotton wound on one of such broaches, he succeeds in cleansing the canals. Where there remains sensitive remnants of pulp in small canals, he uses carbolic acid on the cotton fibers, which, while cauterizing the tissue, will entangle and remove it. In places where stiff and larger instruments can be used, he prefers broaches made from piano wire. For holding the Swiss broaches, he uses small wooden handles.

In filling the canals, gold wire is used as follows:

The end of a piece of gold wire, smaller than the diameter of the canal to be filled, is bent over on itself with the pliers, and crimped to a uniform size in a fine groove in the beaks of the pliers. The length of the portion bent over is not more than the diameter of an ordinary pin. This is done in order to get a better hold of the wire if it ever needs to be removed from the root. In attempting to pull it out, if it does not come, but straightens out, there is

then wire enough to get hold of with suitably made pliers. This doubled end of the wire is then fastened in a delicate pin-vice made for the purpose.

The depth of the canal having been measured by slipping on the Swiss broach one of the little rubber disks cut from the rubber dam by the Ainsworth punch, the wire is cut to the right length, and then, being firmly held by the pin-vice, is filed square to a tapering point by a very fine file. On this wire a half dozen or a dozen fibers of silk or cotton are rolled exactly as is done on the Swiss broach. This is then transferred from the pin-vice to a plugger-point, into the end of which a hole is drilled, large enough to receive the doubled end of the gold wire. The fit is close enough to hold, and yet so loose that when the gold wire has been put to its place in the root, the plugger slips off and leaves it in place.

This gold wire, while held in the plugger-point, is dipped in chloro-percha or oxychloride of zinc and put at once to its place in the root, the canal having just been swabbed with a cotton-wrapped Swiss broach, wet with a very thin solution of the chloro-percha or the oxychloride, as the case may be. When this gold wire is carried to its place, it is certain that the root is filled to its extremity as perfectly as it may ever be. The plugger is of soft steel, so that, in a moment, in can be bent at any angle.

In this manner it is possible to fill these canals through a comparatively small tap-hole. This operation requires nice manipulation (there is none in dentistry that requires nicer); but it can be done, and exactly as described here.

If it is not admitted that these minute roots can be accurately filled in this way, it must be believed that they can be cleaned and sterilized in the manner described, and that is a clean gain, and, by some, may be considered sufficient.

For filling large canals he uses gold wire dipped in chloro-percha. If the canals are open at the apex, he uses gold wire wrapped with shreds of cotton dipped in chloro-percha, and pushed to the apex by exact measurement.

ROOT FILLING.

BY DIFFERENT WRITERS.

International Dental Journal, September.

DR. LOUIS JACK.—To the filling of canals where they are of good size and can be easily made accessible, such as the six front teeth, the palatal roots of upper molars, and distal roots of lower molars, no substance is so good for filling the apical portion of the canals as small cones of gold foil malleted into place, the remainder of the root being filled with gutta-percha or oxychloride of zinc. For the small canals of bicuspids, the buccal canals of upper molars, and the mesial roots of lower molars, the oxychloride of zinc or chloro-percha pumped in as far as attainable have been his usual reliance.

DR. L. D. SHEPARD.—Use the red gutta-percha, rolled into a fine and long cone. This may be two inches long, and tapering from one-sixteenth to one thirty-second of an inch at its greatest diameter to a point. Working some chloroform into the canal take the cone in a pair of delicate forceps, hold it a moment or so in chloroform, so that the outside is softened or partially dissolved, and then press the cone, cold, into the canal. This cone, while soft and sticky on the outside, is, as a whole, stiff, elastic, and yielding.

DR. J. B. LITTIG.—Place in the root-canal a few fibers of cotton, twisted on a smooth broach and saturated with oxychloride of zinc.

DR. J. Y. CRAWFORD.—Thoroughly dry the canal and when exudates have ceased from the apical region, trim a small, fine needle of orange or some other wood made sterile by proper treatment, and around the tiny end of which roll a small quantity of Abbey's soft gold foil, and then tap it into the apical third of the canal, after which the remaining portion of the canal can be filled with any of the reputable root-fillings desired, except tin, lead, and amalgam.

DR. J. TAFT.—Form a cone-shaped piece of lead, or even a fine-grained piece of wood saturated in some antiseptic fluid; carbolic acid or creosote would serve the purpose. It should be made as nearly as possible of the same shape as the canal, so that upon being pressed in it would fill it, without, however, great

pressure. When this cone-shaped lead or wood is prepared, it may be coated upon the surface with oxyphosphate of zinc, and then pressed firmly or driven lightly into the cavity, cutting off any portion that may protrude from the canal or pulp-chamber.

DR. G. V. BLACK.—Gutta-percha cones, not started into the canal with pliers and a hit-or-miss effect made to force them home, but stuck onto the end of a properly-shaped root-canal plugger, the size having been ascertained by trial, and sent to place with certainty. The canal is to be well moistened with oil of eucalyptus first. Canals too small for this are done the best with gutta-percha dissolved in chloroform, but this only when cannot do better.

DR. J. N. CROUSE.—Put some oxychloride of zinc at the entrance of the root-canal; then wrap one or two thicknesses of No. 10 gold around the end of a broach, dip it in oxychloride of zinc, and push it carefully into the end of the canal, using it as a medium to carry the oxychloride. The gold should be lapped loosely around the end of the broach, so that when it is carried into the root-canal the broach can be removed, leaving the gold and oxychloride of zinc at the end of the canal.

DR. R. R. ANDREWS.—After cavities are prepared, use chloroform, then liquid gutta-percha, then gutta-percha points, then heat with hot air, and pack solidly.

DR. IVES.—First, accurate measurement of the root-canal; second, the use of a copper wire; third, the preparation of pure beeswax in a water-bath, to which is added any antiseptic you use—iodoform, if you wish. Take a thread of the beeswax, and with a spatula roll it down to an absolute point. This, fastened onto the end of a nerve-instrument, pass up as far as possible. With an Evans root-drier, heated, drive the wax into the tubuli, adding wax till the canal is full; then with a heated copper point, which protrudes slightly into the pulp-chamber, send it right to the end.

CELLULOID ROOT FILLING.

Dr. Geo. A. Allen says: After thoroughly cleansing, complete the drying-out process by the application of absolute alcohol, followed by a mixture of ether two parts, alcohol one. Fill the canals with celluloid dissolved in ether and alcohol.

COTTON FOR ROOT FILLING.

Dental Cosmos, February.

Dr. Peirce says that while he is not an advocate of filling all roots with cotton, yet if cotton and a little aristol, moistened with chloroform, is packed carefully into a root canal it will make a filling that will protect as well as any other material that can be placed there.

When he fills roots with gutta-percha, he first fills the end of the canal with cotton and some good antiseptic, as iodoform or aristol, first pressing up the cotton and then filling with the gutta-percha.

Dr. Flagg is also an advocate of filling roots with cotton. Neither gentleman proposes to fill all roots with that material. Dr. Flagg says for young people, girls especially, he would fill the canal with cotton, pure raw material, medicated. He is emphatic when he says: "The man who would fill the root canals of a young girl of a bilio-nervous temperament with gutta-percha is either a fool or a rascal." That the bicuspid of a young girl with the canals thus filled, could not remain quiet longer than two or three years. He would fill such canals with nothing except a medicated taper twist of natural cotton, because he recognizes the fact that in from two or three to five years at the outside, particularly in case she should marry, with all the concomitants of pregnancy, etc., it must give trouble; it would be almost impossible for her to have gone through pregnancy without some trouble from such a tooth. Under such circumstances a cotton filling is as easily drawn out as the load from the muzzle of a loaded gun.

EUCALYPTO-PERCHA FOR ROOT FILLING.

Dr. Magill dissolves the gutta-percha in eucalyptol, and when wanted for use, it is warmed slightly over a flame which renders it more liquid, giving more time to work it than chloro-percha.

OXIDE OF ZINC AND EUGENOL, MIXED, FOR TEMPORARY STOPPING AND ROOT FILLING.

DR. S. B. LUCKIE, CHESTER, PA.

Oxide of zinc and eugenol mixed to the consistency of putty and placed in a tooth becomes of sufficient hardness, in a few hours, to make a good temporary stopping. It can be readily removed.

For pulp capping or pulp protection it answers well, but must be mixed thinner. For root filling it is excellent. For sensitive dentine, fill the cavity with it, and allow it to remain two or three weeks.

FILLING THE END OF ROOTS WITH GOLD WIRE.

DR. J. M. DALY, BOSTON.

International Dental Journal, January.

With suitable-sized gold wire for the case at hand, taper the wire and sharpen the extreme point, that it may easily be forced through the end of the canal—not sufficiently to seriously wound the tissues, but just enough to prick a little, the patient surely letting us know when that point is reached. Now mark on the gold-wire broach the exact length of the canal, together with the portion of the wire through the end, and remove and file off the tiny sharpened portion; again insert in the canal and force to the end of the root, to see that there is no pain upon reinsertion; again remove and file into and almost through the wire one-sixteenth of an inch from the end; then again insert, and, having forced to the end of the canal, twist the gold broach slightly, leaving the small portion that was nearly filed off at the end of the root, thus securely sealing it with a "royal" metal.

ROOT FILLING WITH SALOL.

International Dental Journal, August.

The method of Dr. Deane is, after applying the dam, cleanse the root thoroughly by the application of sodium peroxide in pow-

der, working it down into the canals by the use of a fine broach from which the barbs have been removed; then, applying one or two drops of water, allow it to remain until all effervescing has ceased. A piece of sponge is laid by the side of the cavity to absorb the water. Wash out all the solution of peroxide and apply hot air; when thoroughly dry, a fine broach is warmed and carried as far up the canal as possible. Then the salol is taken between the beaks of a pair of long, flat foil-pliers and passed over the alcohol flame, when it immediately melts. Then place the points of the foil-pliers containing the melted salol, on either side of the warm broach in the root-canal, and gently open the forceps. The salol will immediately run up the broach and fill the canal. Gently withdraw the broach, and if any air is at the apex of the root it will be seen to follow the broach down and appear in a bubble on the surface of the salol. Apply cold air and fill at once.

ROOT-CANAL STERILIZATION.

BY DIFFERENT WRITERS.

International Dental Journal, September.

It is not to be presumed that the writers quoted follow these methods as fixed rules. They are given to meet the requirements of ordinary cases.

DR. JARVIE.—With heat, dry the root of the tooth as much as possible. Roll a piece of copper wire so that the small end is fine enough to penetrate and flexible enough to follow most canals. Insert the wire into the canal with the other end protruding from three-quarters of an inch in the case of a front tooth to possibly two inches in the case of a back tooth. Heat the bulb of an Evans root-drier, having first removed the point, until it is quite hot, and then insert the protruding end of the wire into the hole in the bulb. Copper being a good conductor, the heat from the bulb will be conducted to the extreme end of the wire, and you will thus get a condition of dehydration in the root-canal and tubuli such as cannot be obtained in any other manner.

DR. LOUIS JACK.—The most important consideration is not to force the infectious matter contained in the canal through the

foramen, and to avoid the use of infected instruments. It is safer to oxidize the contents of the canals with permanganate of potash, by inserting a small crystal, and permit it to decompose the organic matter present, and afterwards to carefully cleanse the canals, following with aristol and oleum gaultheriæ in cases where pus is not present.

Should pyemic conditions exist, reliance is upon zinc chloride five to ten grains to one drachm of water, or formalin five per cent. solution, in all cases following with aristol as before.

Be careful to avoid the use of irritating medication. Better results follow the above line of treatment than when more active remedies are employed, such as pure carbolic acid and corrosive sublimate.

DR. E. C. KIRK.—By the application of (1) a saturated solution of sodium peroxide, and (2) twenty-five per cent. pyrozone.

DR. A. W. HARLAN.—Repeated washings of the root-canal, first with neutral peroxide of hydrogen or pyrozone; second, with cinnamon-water or peppermint-water. Dry the interior and introduce a strand of silk or cotton wet with myrtol; seal this in the cavity for one or two days with gutta-percha. After this is taken out, do not let saliva or water get into the root. Fill it.

DR. C. N. PEIRCE.—For thoroughness in removing all decomposing organic matter there is nothing which goes to work with a determination to clean out everything which is impure as does the sodium peroxide. Have no hesitation in putting a minimum portion of this in the root, and, covering it over with gutta-percha, let it revel for twenty-four hours; then wash it out with dilute sulphuric acid.

DR. S. H. GUILFORD.—Root-canal sterilization can be best secured by first removing with a drill (where possible) a portion of the most infected dentine bordering the canal, and then subjecting the remaining portion of the dentine to the action of some sterilizing medicament that will be rapid in its action, efficient, and non-injurious to tooth-structure. Iodoform in the hands of the writer produces better results than any drug.

DR. JOHN S. MARSHALL.—First, thoroughly remove all pulp débris by broaches wrapped with fibers of cotton. Second, disinfect with ninety-five per cent. carbolic acid and dry the canal. Third, flood the canal with absolute alcohol and evaporate with hot

air until thorough desiccation is obtained. The rubber dam is indispensable in all cases.

DR. MCQUILLAN has had the best results from the use of sodium and potassium, followed with pyrozone, three per cent., and thoroughly drying with hot air.

DR. LITTIG.—Thorough cleansing and drying. The kind of drug employed makes but little difference as to whether it is a coagulant or not.

DR. JAMES TRUMAN.—The agents used may be briefly stated to be those that act on organic matter—hydrogen dioxide or pyrozone; or the alkalies, as sodium peroxide; or a combination of the escharotics and alkali, as sulphuric acid and bicarbonate of soda. These are practically cleansers, while in a degree they are antiseptic.

Follow with one of the following antiseptics proper: mercuric chloride, hydronaphthol, thymol, creolin. The latter he regards as one of the best antiseptic cleansers we have now in use. Used in full strength, with cotton to wipe out the canal, it is most effective. If this has been carefully done, the canal should be dried by the warm air blast.

DR. ANDREWS.—Clean thoroughly, use five per cent. pyrozone, dry thoroughly, and then fill, having all the instruments surgically clean.

DR. CRAWFORD.—The surest treatment to effect root sterilization is first to isolate the tooth by the use of rubber dam; dry the cavity and as much of the canal as possible before proceeding to cleanse the same of foreign contents; in the first exploration be certain to avoid too much pumping with medicated swabs. Use bichloride of mercury, not stronger than one to three thousand, to frequently wipe out the canal during the operative procedure, so as to keep sterilizing all the newly infected particles that may occur. When the canal is thoroughly cleansed and made perfectly dry, close it up for a few minutes with a dry tampon of cotton, to give the last wiping of bichloride of mercury time to act upon any bacilli or micro-organisms that may be present. If it is desirable to test the condition of asepsis thus produced, pack the canal with cotton saturated well with pure German beechwood creosote, as this is the best antiferment that has ever been placed in the canal of a pulpless tooth. In addition, it certainly has some anodyne effect

upon the peridental membrane when it is coincidently involved as a result of a septic condition of the contents of the pulp canal.

DR. BLACK.—Pack with oil of cassia or some mixture containing it in sufficient proportion—not less than one-sixth. The 1, 2, 3 mixture is my standard. Close the cavity perfectly with gutta-percha—no cotton or gum, moistening the walls with eucalyptus first, and let it remain one week. Put on the dam before beginning.

DR. CROUSE.—When the pulp has been dead for some time and the tooth needs sterilizing, use Black's 1, 2, 3 compound, composed of one part carbolic acid, two parts oil of cinnamon, and three parts oil of wintergreen. Oil of cinnamon will sterilize a tooth quickly, but should not be used for the front teeth, as it frequently turns them yellow. For teeth in the front of the mouth use bichloride of mercury, or carbolic acid, or both; the bichloride first, and then the acid.

TREATING ROOTS WITH SULPHURIC ACID FOR IMMEDIATE FILLING.

DR. CHAS. WELCH, WILMINGTON, O.

The writer reports having treated a large number of roots by this method with success. Non-fistulous abscesses he treats differently, and as follows:

After having cleansed the canal with acid, fill it with glycerin and iodoform made into a thick paste, leave in a week, then remove, and fill permanently. For all other cases, first apply the rubber dam. Open the pulp chamber freely, take with pliers a pledget of cotton, soak in sulfuric acid and place it into the chamber. With a No. 5 Donaldson canal cleaner pump the acid into the canal to the apex of the root. You may know when you have reached the apex by the patient complaining of pain. No trouble will arise by the acid going through the foramen.

Second. With a drop tube flood the chamber with a saturated solution of bicarbonate of soda, which, by the formation of carbonic acid gas, throws out the dèbris, neutralizing the acid, at the same time cleansing and apparently whitening the teeth. Then dry thoroughly with a five per cent. solution of pyrozone followed with hot air.

Third. With a minim syringe flood the canal with carbolic acid and iodine, equal parts; followed with iodoform and glycerin, which force through the root. Then use chlora-percha with a gutta-percha point, which finishes the treatment, and the tooth is ready for a permanent filling.

WIRE BRADS FOR ROOT POSTS.

DR. GRANT MITCHELL, CANTON, O.

In cases of badly broken down molars, fill the roots with chloro-percha, then with a strong mallet blow drive a small wire nail firmly into each root. Build on an amalgam crown in a matrix, or otherwise.

TO CONTROL EXCESSIVE FLOW OF SALIVA.

Dr. H. O. Logue says to control a case of excessive flow of saliva, which made operating on the lower third molar almost impossible, he administered to the patient 1-120 of a grain of sulphate atropin, half an hour before operating, with excellent effect.

[This remedy must be used with great care.—ED. COMPENDIUM.]

PRACTICAL USES OF SALOL.

DR. R. M. SANGER, ORANGE, N. J.

International Dental Journal, August.

As a root filler salol is manipulated in this manner: Having the rubber dam adjusted, the cavity dry, and the canals sterilized by any of the various methods at our command, the root is thoroughly dried with an Evans root-drier, and the salol crystal placed in the cavity with a flat spatula or an amalgam carrier. The hot root-drier is then passed through the powder, which immediately melts and follows the instrument into the canal, following by capillary attraction beyond the point where the instrument stops.

Repeating this once or twice, the canal will be entirely filled with the liquid salol. A warm tin or copper canal point is then introduced and carried carefully as far into the canal as possible without passing through the apex. It is then left for a few moments to cool, when the canal point will be found to be solidly imbedded in a crystalline, antiseptic mass which entirely fills the canal. If the cavity is so situated that the crystals cannot be readily placed in position, the salol is first melted in a test tube, care being taken not to heat it more than just enough to liquefy the powder. Then by the use of a glass syringe, slightly warmed, the salol is placed in the cavity and carried to the end of the canal by the use of the root-drier, as before.

A single failure is yet to be recorded from the use of this material. He believes it to be as near the ideal root-filling as anything yet offered to the profession.

If, from any cause, it should be desired to remove the filling, a warm instrument held against the metal point will quickly heat it through, causing the salol to melt, and the whole can be readily washed out of the cavity with alcohol without any undue pressure or irritation to the sore tooth.

Just a word here regarding these little glass syringes. They are made of blown glass, and may be heated over an alcohol or Bunsen flame, and the point bent to any desired shape without fear of breaking if care be used when the heat is first applied. They are very cheap, costing about one dollar per dozen, and will be found extremely useful where a syringe is needed.

We frequently have cases presented where the teeth have decayed to such an extent that to remove all the infected tissue would expose the pulp, and to leave it would almost certainly insure exposure and trouble from recurrent decay unless thorough sterilization can be secured and maintained. Let us suppose the case of an inferior first permanent molar. Having adjusted the dam, dried the cavity, and removed as much of the infected material as the condition will admit, sterilize the remainder as thoroughly as possible, by the use of whatever non-irritating germicide the operator may prefer; the cavity is then thoroughly dried, and the crystals of salol placed in with a flat spatula, and melted by passing over it a smooth, flat burnisher or amalgam plugger warmed suf-

ficiently to liquefy the salol without causing pain to the patient. The less heat used the more quickly crystallization takes place again, which should occur in three or four minutes at the longest. We have now sealed the floor of the cavity with a firm mass of antiseptic material capable of receiving considerable pressure without inconvenience to the patient. This is far from being a non-conductor, however, and should be covered with a layer of cement before the final filling is inserted.

In treating an upper tooth under similar circumstances the only difference would be in the manner of introducing the salol. Here we take a piece of asbestos felt, cut to fit the floor of the cavity, warm it over a spirit lamp, and place it against the salol crystals, which have been placed on a glass slab for that purpose. Immediately the salol is melted and taken up by the asbestos, until it is more than saturated. It is then placed in the cavity, and, upon cooling, we proceed as before, not forgetting the cement, however, as the asbestos thus treated does not give a non-conducting surface.

Where the pulp is actually exposed, and we desire to cap it, remove as much decay as possible around the edge of the exposure, and saturate the floor of the cavity with oil of cloves or cinnamon to relieve the pain, if any be present, and sterilize the cavity. A small disk of platinum, about 32 gauge, is then cut to fit the floor of the cavity, and the center depressed with a ball burnisher, thus forming a metal cup. A paste is made of carbolic acid, oxide of zinc, and vaseline, with which the cup is filled, and placed gently over the exposed pulp. The crystals of salol are then placed over the cap and liquefied by passing over them a warm, flat burnisher. In a few moments the cap and floor of the cavity are hermetically sealed, and the tooth is ready for filling.

Salol is readily dissolved by any of the volatile oils or alcohol. All surplus should be carefully removed from around the edges of the cavity and the outside of the tooth, as it is irritating to the mucous membrane, and will make an abrasion somewhat resembling a canker if left in contact with the gum. This sore is not dangerous, however, and will heal in a day or two, the healing being hastened by the application of vaseline.

CONVENIENT APPLICATION OF NITRATE OF SILVER.

Dr. A. M. Holmes says dip silver wire in nitric acid and insert in the cavity. The action of the acid on the silver forms the nitrate in situ; the wire being easily directed, the application is made to the exact place desired.

REMOVING GREEN STAIN.

DR. S. B. PALMER, SYRACUSE, N. Y.

Dental Cosmos, September.

The writer, after experimenting with many agents, has adopted pyrozone, three per cent., to moisten the pumice, and in extreme cases he adds two drops of phosphoric acid, that which is used for cement fillings, to a teaspoonful of moistened pumice; after using this, the patient washes the mouth with water containing bicarbonate of soda.

Dr. Gramm says that in obstinate cases, instead of removing the cuticle with pumice, he prefers to apply for a few minutes a ten per cent. solution of hydrochloric acid, which, he says, is but faintly acid, and removes the cuticle at once, stain and all. This is to be followed by an alkaline wash, and the teeth to be thoroughly polished with chalk.

SPONGE GRAFTING.

The use of sterilized sponge in treating cases where alveolotomy has been performed is valuable.

Dr. Briggs, of Boston, is a strong advocate of the practice. After the drill has cut away the abscess and opened up the track, small pieces of the sponge are placed in the cavity. It acts as a drainage, and, according to Dr. Briggs, it becomes absorbed after awhile.

The sponge is also useful in deep, wide alvoela pockets.

BLEACHING TEETH.

Dr. E. C. Kirk says: Saturate the dentine with strong sodium peroxide, followed by treatment with dilute hydrochloric acid, to neutralize the alkali. Wash with hot water.

TO PREVENT RECURRENCE OF DISCOLORATION IN A BLEACHED TOOTH.

Dr. I. C. St. John says: Fill the tubuli with white paraffin, melting it in by placing it in the pulp cavity and passing a heated piece of metal over the surface of the enamel.

BLEACHING TEETH WITH OXYPHOSPHATE OF ZINC.

Pacific Stomatological Gazette, November.

Dr. J. Foster Flagg says the bleaching of teeth with the modern agents is not permanent in effect, and that the only way is to use oxyphosphate of zinc, which is made by combining the plain, uncalcined oxide of zinc with any menstrum of zinc phosphate. This makes a reasonably strong, adhesive, non-shrinking, and purely white plastic, which, he says, increasedly whitens the tooth if this is desirable.

ELECTRICITY AND PYROZONE FOR BLEACHING TEETH.

Dental Cosmos, April.

The following method suggested by Mr. Evans, of McKesson & Robbins, is related by Dr. E. C. Kirk:

The tooth to be bleached is prepared and desiccated, with the rubber dam adjusted, as in the manner for ordinary bleaching operations. A pledget of cotton saturated with twenty-five per cent. pyrozone is introduced into the pulp chamber, canal, and cavity of

decay, and the positive pole of a battery of low tension, furnished with a needle-like platinum electrode, is touched to the surface of the pyrozone. The negative electrode may be held in the hand of the patient, or when mounted with a suitable platinum point may be applied to the outer enamel surface, and the current short-circuited through the tooth structure in any desired direction. Decomposition of the pyrozone at once follows completion of the circuit, and bleaching of the tooth rapidly ensues. By applying the negative electrode to the enamel surface the bleaching effect is produced immediately under the point of contact, and can thus be brought to bear on any area of local discoloration at will. The treatment of pulpless teeth in the manner indicated is an advance over former methods, and one of more significance than may appear from a casual observation.

Bleaching of a tooth by any method which insures thoroughness of the operation is equivalent to absolute sterilization. This, no doubt, is attainable with pyrozone unassisted if sufficient time is taken to accomplish the result; but by means of the cataphoric action of the electric current, as noted, pyrozone is driven to the ultimate ramifications of the tubuli, and its active oxygen set free by the current in direct contact with any organic debris which may be present as a menace to the future comfort and integrity of the tooth.

CLEANING TEETH.

Journal British Dental Association.

Mix the pumice with a solution of castile soap, instead of pure water. It cleans easier, and leaves a smooth finish.

TREATING PULPLESS DECIDUOUS TEETH.

DR. S. B. BROWN, FORT WAYNE, IND.

Dental Practitioner and Advertiser, October.

The operation consists in treating all deciduous teeth having pulp complications, as practiced in permanent cases, up to the point when ready for filling. In molars the tooth is perforated with a

small drill entering the cervix at the mesio-buccal line, one-sixteenth of an inch beyond the gingival border, and terminating on the floor of the pulp chamber. This opening must communicate with the pulp canals to afford a vent for any fluid accumulating, the gum serving as a valve to exclude extraneous matter.

The root canals are treated with nitrate of silver, to resist decay. Place a lead disk or floor, well adapted, on the base of the cavity, to prevent the filling material obstructing the vent which must communicate with the root canals. Upon this floor fill or crown, as preferred.

TREATING PULPLESS DECIDUOUS TEETH.

DR. J. Y. CRAWFORD, NASHVILLE, TENN.

Dental Cosmos, May.

Dr. Crawford has a way of his own in treating pulpless deciduous teeth. He says: In the treatment of the pulpless baby teeth, upon the side of the mouth—the molars, not the six front teeth, particularly not the four front teeth—those cases that require treatment as the result of excessive caries, early in life, at the fourth, fifth, and sixth year, before the eruption and adjustment of the first permanent molar above and below. The treatment of pulpless baby teeth at that time of life, is to do as little work as you can on the tooth. Handle it as little as you can. Accomplish the feat of giving relief when the patient first presents, and leaving the parts in an aseptic condition, and after the tooth is made comfortable, fill by medication, using such medicaments as phosphate of zinc mixed with German wood creosote in the canals, if you enter the canals at all; then into the bulbous portion ot the pulp-chamber put in a plug of gutta-percha, and over that put a capping of cement. In a few days make an appointment for the little patient, and amputate the tooth, non-antagonize it. The original idea with him, which he insists is a practical one, is to start the process of exfoliation before the coming forward of the first permanent molar and the locking of the dead baby tooth between the tooth in front and the tooth back of it.

Do not think if it is non-antagonized once, that will do away

with everything else. The process of exfoliation will bring the teeth together again. Keep on cutting off from time to time until you get to the bifurcation of the root, and you have done away with the necessity of extracting a baby molar.

REPAIRING BADLY DECAYED FRONT TEETH.

DR. D. MURLESS, HOLYOKE, MASS.

Dental Digest, December.

If we consider an incisor with a third, a half, or even more, decayed and broken down from the approximal and cutting edge, taking away a large corner of the tooth, and in many cases containing a live pulp, and when we reflect on the troublesome consequences of death of the pulp, or even pulp irritation, which is very likely to follow filling, we see that it is imperatively demanded that the effort at pulp-conservation be made. Such a tooth as described can be filled and restored to its original size and shape, by first filling with some plastic, and then putting on a gold cap or crown, with an opening in its face of such shape and size as will just cover the margin of the cavity, having but very little more gold in view than would be seen if the tooth had simply been filled.

There are many advantages in this method, as teeth can be saved that it would be nearly impossible to preserve by other treatments; for example, many times we find the molars of the lower set lost, and persons in such a condition in using their teeth bring the lower incisors against the lingual side of the uppers. Where they have been thus used for some time the lower teeth will be worn on the cutting edge and shortened, and the lingual surface of the uppers will be worn by abrasion, so much so that the under side of the uppers will often be worn away, forming a shoulder at the neck of the tooth, and occasionally the labial surface will be worn thin. In such cases there is no way to retain a filling, but the tooth can be backed up with cement, and a cap, such as described, be telescoped over it. By this means the cutting edge is thoroughly protected, the whole tooth bound and held firmly together, and we may say it is as strong and serviceable as ever and needs no more care than if it were perfectly sound.

STAYING LOOSE LOWER FRONT TEETH.

DR. W. H. TRUEMAN, PHILADELPHIA.

Dental Cosmos, July.

Through each tooth that is to be secured to the bar, clear through from the labial to the lingual surfaces, drill a hole to accommodate a screw-threaded wire, locating the same as nearly central as may be to the width of the tooth, and sufficiently near the cutting edge to avoid encroaching upon the pulp.

Accurately fit a bar, preferably made of a strong metal, so as to secure strength without bulk, to the lingual surfaces of the teeth. It is desirable that this bar shall approach closely the cutting edges of the teeth, and extend toward the gums sufficiently far that the lower edge will be below the most prominent portion of the tooth, and so less noticeable to the tongue. It is also desirable that it shall fit accurately the surface of the tooth, forming a matrix in which the tooth rests. The bar must be sufficiently thick to afford secure hold to the screws by which it is drawn closely to the teeth.

Being provided with a screw tap, screw-threaded wire, screw nuts, and a drill to match, hold the bar firmly in place, pass the drill through the hole in any one of the teeth most convenient, and continue the hole through the bar. Withdrawing the drill, while the bar is still held in place, tap the hole just made. It is important in most cases that the hole be threaded while the bar is in position, otherwise during the operation the direction of the hole may be changed. Now pass the threaded wire through the tooth and screw it into the bar, cut it off, allowing it to project beyond the labial surface of the tooth sufficiently to accommodate a screw nut. If it can be done, it is best to solder the screw to the bar. The screw and bar in place, put a nut on the end of the screw projecting beyond the labial surface of the tooth and draw it tight. In like manner proceed until each tooth is fitted with a screw and nut.

Remove all the screws, laying them down in order, so that they can again be quickly replaced; coat each nut with a little oil or vaseline; dry the teeth; coat them and the bar with zinc-phosphate cement, quickly place it in position, and immediately insert the screws, coating each one as it is placed in position with cement, and draw the nuts evenly tight. It is desirable that the cement

shall fill all space between the bar and the teeth, and as thoroughly fill the holes through which the screws pass. After all is in place, it is well to work the cement between the teeth, filling any spaces which may offer lodgment to food dèbris.

After the cement has well hardened, with suitable tools smooth off the ends of the screws projecting through the bar; then remove the nuts, clip off the projecting ends of the screws, and polish them down even with the surfaces of the teeth, and remove the superfluous cement.

FILLING PULPLESS TEETH WITH FISTULOUS OPENING.

DR. C. N. JOHNSON, CHICAGO.

Dental Cosmos.

First, the soft, decalcified, infected dentine should be cleaned from the cavity, and the pulp-chamber thoroughly opened up. The putrescent contents of the canals should be removed as perfectly as may be by way of the cavity, to accomplish which the chamber and canals should be flooded with an antiseptic, and this absorbed with cotton or bibulous paper. When the canals are cleaned the abscess should be injected with the antiseptic through the canal, and the process kept up if possible till the medicine appears at the fistulous opening on the gum.

The best means ordinarily to inject an abscess is to pack the canal tightly with cotton saturated with the medicine, and then force down on it a mass of rubber such as is used for vulcanizing plates. Where there are several canals, and it is intended to inject only one of them, the others may be left empty, and the force against the rubber directed in line with the packed canal.

When the medicine appears at the fistulous opening, if it is of recent occurrence, the cavity may at once be sealed—after replacing the cotton in the canal with freshly saturated cotton—and the patient dismissed for one week. If it is of long standing, where the dentine of the root seems much infected, it is best after the injection to flood the canal with alcohol and evaporate to dryness before applying the antiseptic and sealing the cavity. This insures

a more thorough saturation of the tubuli with the antiseptic, and the tooth will return in sweeter condition than if the drying had been omitted.

At the end of a week all ordinary abscesses will be cured if this practice has been followed faithfully. When the patient returns, and the fistula is found perfectly closed, the root may be filled at this sitting.

If the fistula still discharges, a change in the procedure is called for. In the use of an antiseptic at the first sitting, one has been selected which is diffusible, and which is not strongly escharotic. Usually Dr. Black's 1, 2, 3 is employed; and it is felt that if care had been exercised in thoroughly cleaning the canal, in evaporating the moisture from it, and subsequently sealing the antiseptic in the canal for one week, the canal itself is in a condition which would not account for the persistence of the fistula. The trouble is probably beyond the apex, and the tissues at that point require more vigorous medication than that applied at the first sitting. They need stimulation and cauterization to break up the chronic condition. With this idea, carbolic acid, ninety-five per cent., is injected till it appears at the fistulous opening. The canal is then packed with cotton saturated with carbolic acid, the cavity sealed, and the patient dismissed.

If there has been much discharge with a free opening, pyrozone, three per cent., may be injected prior to the use of carbolic acid and sealed for a week, and the treatment repeated if the fistula is found open at the end of that time. Where the discharge is slight, dismiss for two weeks after the second sitting. Frequent treatments should be avoided, unless there is a copious flow of pus, indicating a rapid breaking down of tissue. Then the case must be fought vigorously, the treatment being directed by way of the fistulous opening instead of through the tooth.

In chronic slight discharge, where a third treatment has been found necessary, the dressing in the canal should not be disturbed for a month. The operator may see the patient at intervals in the meantime, and if he deems it necessary may treat the fistula through the opening; but in very many of these cases no treatment at all is preferable.

SEPARATING TEETH.

Dental Office and Laboratory.

Dr. C. F. Chupein makes use of rubber dam rolled or twisted, for separating teeth. The piece can be made as small or large as desired, and stretched between the teeth.

SEPARATING TEETH.

Dental Register, February.

A method is described which may be called the Dunn method, it is so similar to that. It is worth repeating. To separate the incisors pass a tape between the teeth and tie a knot around and drive it in between them, the force of the knot being drawn between will exercise a mechanical influence there—the swelling of the fiber will make a separation. If there is a large cavity it is difficult to tie the knot. In cases of that kind pass the knot between the teeth and put a piece of cotton in to fill the cavity and then pull the knot.

CORK FOR SEPARATING TEETH.

Pacific Stomatological Gazette, August.

Dr. Denham, of Santiago, states that the application of cork for separating is less painful than any other material. It produces neither irritation nor inflammation, and patients can attend to the separating, preparatory to a filling, themselves. He cuts strips about three-eighths of an inch wide, and with a sharp pen-knife bevels one side to a thin edge, and from these he cuts pieces as required.

ZINC PHOSPHATES AND THE ACCURATE USING OF.

DR. J. FOSTER FLAGG, PHILADELPHIA.

Pacific Stomatological Gazette, November.

The original nitrated oxide of zinc has held its own front place ever since it was first given, and every attempt to improve

upon it has, so far as he knows, signally failed. The fluids, crystals, and pastes which have formed the menstrua for the phosphoric plastics have undergone numerous changes, both for better and for worse, until we have now several which are variously acceptable.

For himself, he inclines to the class known as gelatinized fluids, for the several reasons that they make good mixes, attain neutrality promptly, and maintain a good integrity for great length of time. He is using for college demonstration a fluid which was made in February, 1893, and knows of no menstrua which are "excellent" when first made that maintain their integrity nearly so long as these, and this he regards as a most important attribute.

For the accurate using of zinc phosphate it is essential that it be mixed in three ways:

1. To a creamy consistency for the setting of crowns and for the securing of bridge-work and certain forms of irregularity fixtures;

2. To a sticky consistency of required strength—for strengthening walls—for lining cavities, and especially for combination guards and combination fillings;

3. To a stiff, putty-like consistency—a very nice, accurate, exact, and rapid manipulation—by means of which the most possible powder is incorporated with the menstruum, which it, in turn, is capable of thoroughly acting upon.

It is upon this result that the possibilities of any given sample of zinc phosphate are demonstrated, and thus is shown the marked difference in density between those cements of which the powder is merely calcined oxide of zinc, and those of which the powder is nitrated oxide of zinc.

Zinc phosphate does not rank as a filling material, for the reason that it is unreliable (all filling materials possessing certain definite attributes), for no one knows anything about what it is going to do in any given case; but when it is to be tried as a filling material it should be mixed in the third way, for this has given decidedly the best clinical record during the past ten years.

PROSTHETIC DENTISTRY.

CORRECT POSITION OF AIR CHAMBERS.

DR. H. H. BURCHARD, PHILADELPHIA.

Dental Cosmos, November.

The writer says, no doubt there are many cases in which a satisfactory contact and stability are obtainable without the use of a chamber, but he has never seen a case in which a greater adhesion, an increased and permanent stability was not secured by the use of a chamber, of the proper dimensions and position.

The hypothesis, that the function of the chamber is but temporary, ceasing with the improved plate adaption which occurs after the piece has been worn for a period. That the soft tissues fill the chamber and destroy its function.

Observation of a number of cases will show, or, better, actual tests upon plaster models will show that in but a small percentage of cases is the chamber ever even approximately filled, and then only when broad and shallow, or undercut chambers have been used for cases having soft, flabby tissues. Again, in any case, test the effect of the absence of the chamber by temporarily filling the space with wax; a marked loss of adhesion occurs.

The writer has always held that the chamber has a positive and enduring function, and that it did constitute, in a great measure, a vacuum chamber; a depression from which the air is almost exhausted.

To find the correct position of a chamber, draw first on the plaster model the median line of the vault. From the centers of the cuspidati to the centers of the third molars draw diagonal lines, the diagonals of the trapezoid. When all the teeth are absent, draw from the positions formerly occupied by the cuspidati to the centers of the condyles, the two diagonals.

To find the center of gravity, draw from the centers of both condyles lines to the junction of the first and second bicuspids of the

opposite sides, other lines which intersect at a point of the median line G; this point will be the center of gravity of the trapezoid and of the palatal vault. The intersection of the diagonals will mark the focus of the small parabolic area to be covered by the chamber-piece. Draw this parabola, its apex, about as far in front of the point of intersection of the diagonals as the center of gravity is behind the latter point, the angle of the parabola, the same distance from the center of gravity as the apex. Should there be a lack of harmony, of bilateral symmetry of the right or left sides of the arch outlines, make the outline of the chamber in correspondence.

FIG. 1.

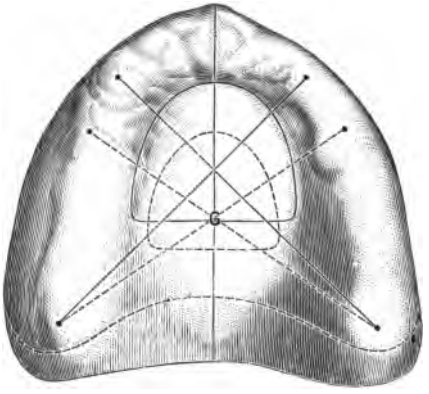


Fig. 1 represents a model, having the outline of an old chamber too far front; the correct position is marked behind it, also the lines which have determined its position. It may be remarked, parenthetically, that an increased stability was secured by correcting the position of the chamber in this case.

To form the chamber-piece, fold a small strip of paper, and lay the line of fold along the median line of the arch, and on the surface of the paper draw one-half the outline of the chamber area. While folded the paper is cut along this line, unfolded, and is now the pattern for the chamber-piece. If of metal, mark the shape of the paper on the metal and cut out, and fix in position by means of a pin at the apex and at each angle.

If of wax, cut from a sheet of gutta-percha and wax base-plate (which is usually too thin by half for chambers). Make this cut firmly and sharply. Soften the wax slightly, flow over the height

of the vault a little melted adhesive wax, and press the wax chamber into position, the outlines of wax and pencil-marks corresponding. A warmed spatula is used to smooth the edges of the chamber, which should be sharp, distinct, and a slight slope given to the walls. Chambers which have not sharp outlines do not afford firm adhesion.

This description may imply a lengthy or somewhat complicated operation for such a matter as making a chamber, but a trial of it will show it to be simplicity itself; and it may be done as expeditiously as with other methods. There is also an increased assurance of accuracy. The method, of course, does not apply to cases in which it is impossible to use a median chamber.

ALUMINUM AS A BASE FOR ARTIFICIAL DENTURES.

DR. E. R. JOHNSON, BUFFALO, N. Y.

Dental Practitioner and Advertiser, April.

The recent production of pure aluminum has done away with the old cavil that it disintegrates in the mouth, and a new trouble has appeared upon its horizon. It is urged that the metal is soft and very pliable after it is swaged. It is concerning this objection that I wish specially to speak. Improper annealing is the usual cause of soft, pliable plates, the usual method being to coat the metal with sweet oil, then to hold it in the flame of a Bunsen burner until the oil has burned off, when it is immediately plunged into cold water. This softens the metal, but leaves a surface tension which is objectionable at this stage of the manipulation, for it makes a re-annealing necessary before the swaging is finished. This again softens the metal, and as it has already taken on the shape of the intended plate, there is not enough swaging and manipulating to be done to temper it again, while if it is not annealed the metal becomes so rigid that perfect adaptation and the avoiding of wrinkles in the plate are almost impossible.

The surface tension is accounted for as follows: Before annealing the metal the crystals are all elongated by the rolling of it into sheets. When the metal is heated for the annealing, the crystals

tend to assume their original molecular arrangement, but when the metal is plunged into the cold water the molecules become stretched in taking their normal position, so that the outer surface or the outer layer of the crystals has assumed this surface tension.

Another proof that the molecules change positions and shape, can be observed if one will try the metal in a gauge before and after annealing. If it is twenty-four before annealing, it will be found to be twenty-five afterwards. If one would avoid this surface tension, he should be more careful about annealing and swaging. After the metal has been coated with oil, and this burned off in the Bunsen flame, it should be allowed to cool down gradually. It will be found that it takes some time to do this sufficiently to permit handling, but if it be carefully attended to it will permit a perfect molecular arrangement, and it will be found that the metal is much softer than when annealed in the old way. It will also have increased in thickness from a twenty-five gauge to a very tight twenty-four.

In swaging the metal the palatal portion should be swaged first. This can most easily be done by banking the die with moulding sand up to the ridge, and simply making a counter die of the palatal portion. Swage from this, and then hammer the metal over the ridge into place as nearly as possible. It will be found that it works very easily, and that wrinkles are handled with the utmost ease. After it is well beaten to place, a new counter die is run, as in the ordinary way. Finish swaging from this. It will be found that the metal is very materially condensed between the die and the counter die. Another reason why the metal is found too soft is that the vulcanizing is done at a point that is too high. A temperature of 350° will soften the metal. Where vulcanizing is done at 320°, the inside of the vulcanizer will be at least 340°, and should the vulcanizer run up a few degrees above 320°, as is often the case, the metal will come out soft. The vulcanizing should be done at 300°, for an hour and thirty minutes.

In conclusion, let me suggest that the metal be placed so that the former grain shall be transverse, or from heel to heel.

CLASPS FOR PARTIAL DENTURES.

DR. F. MESSERSCHMITT.

Dental Cosmos, May.

To make a perfect-fitting clasp, obtain a true model of the mouth, and having decided which teeth you intend clasping, take a strip of tea lead or heavy tin foil of the required width, and fit it accurately to the plaster tooth, shaping the edge next to the gum in conformity with the irregularities in the latter around the neck of the tooth. Cut an exact counterpart of the pattern thus obtained from a piece of clasp metal, about 27 or 28 Brown & Sharp gauge. This should be conformed as perfectly as possible to every portion of the surface of the tooth embraced by it; remove the clasp and cut a counterpart of pattern from a piece of pure gold plate, 36 gauge. Having previously studied the articulation, cut this metal, allowing a small end to extend onto grinding-surface, at a point where it will not interfere with the bite. This material being thin, can be fitted perfectly to the plaster tooth. Bending the end down onto the grinding-surface, and placing the previously made clasp directly over it, fill up the intervening space with hard wax; when cold, remove the whole clasp carefully from tooth, invest, and flow solder between the two clasps. Fit the clasps to the other teeth in the same manner, and proceed as usual. If the clasp is intended for vulcanite plate, attach a strip of gold or platinum to it, in such a position that it will be inclosed in the rubber.

The advantages of this clasp are perfect coaptation, excluding all solid substances from between the clasp and tooth; preventing decomposition of food, and pressure of the plate on the gum-tissue.

RUBBER TOOTH FOR SHORT BITE.

DR. ABRAM PELHAM, PLYMOUTH, MICH.

Many times in making partial upper plates the lower teeth are so elongated, and the space for a tooth so short that it will be ground away to adapt it. As a substitute, select any old tooth of the size, place it on, and when ready to pack, take it out and fill the space with white rubber.

TO REMOVE MODELING COMPOUND FROM PLASTER CAST.

DR. F. MESSERSCHMITT.

Items of Interest, May.

To remove modeling composition that adheres to the cast, caused by overheating in separating, run hot wax over composition with the spatula, allowing it to become thoroughly hard. Pass the point of the knife blade under the edge of the wax, peeling it off; the composition will come with it, leaving the cast perfectly clean.

RUBBER LINED CLASPS.

Dental Cosmos, November.

Dr. W. Bowenthall says to line the clasps of plates with rubber, by serrating the clasps and vulcanizing rubber over the inner surface, will materially prevent the abrasion of the teeth clasped.

CLEANING IMPRESSION CUPS.

DR. E. B. EDGERS.

International Dental Journal, August.

Give the impression trays a coating of sweet oil with a woollen cloth. Put them in strong soapsuds (made with soap shavings or powder), boil, and wipe dry. Polish with whiting by using a soft woollen cloth or fine leather. In this way trays can be kept bright and clean, and the plaster will not adhere to them.

TO CLEAN IMPRESSION CUPS.

DR. A. LEEMING, BLACKBURN, ENG.

Ash's Quarterly, June.

On separating from the model, take away with the fingers as much of the composition as possible. Then immerse the tray in hot water. When the composition is soft, rub it off the tray with

a blunt-pointed hard-wood stick. Keep the stick wet so that the composition will not adhere to it. When all the composition is rubbed off, which will take about a minute, immerse the tray again in hot water, and then dry it and rub it with a soft cloth, and a bright, clean tray will be the result. This is due to the fact that the stick burnishes the tray, while at the same time it removes the impression material.

USING OLD PLATE FOR IMPRESSION CUP.

Dental Register, April.

Dr. Ames says if a patient presents for a new denture and has an old misfit one, he uses that as an impression cup, extending it, if necessary, by using base plate.

TO MAKE SPECIAL IMPRESSION CUP.

DR. B. H. CATCHING, ATLANTA.

Cut a piece of base-plate wax to approximate the size of the jaw, with an allowance, if for an upper, sufficient to press up to the roof and to cover the ridge. Warm the wax-shape and place it in the mouth, and mold with the fingers to adaptation. After having removed carefully, trim the edges with scissors, attach a wax handle. Invest in halves in plaster, making the investment thin. When the plaster has set, separate the mold, remove the wax, and pour with fusible metal. A cup can be made in twenty minutes. Dry the mold and pour with type metal, if a more durable cup is wanted.

DIES FOR SWAGING.

Dominion Dental Journal, May.

Where the impression has been taken in modeling compound, a very good way to make dies is: After the model is trimmed the same as for molding in sand, cover with tin foil well burnished to the palatine surface. Place model on a smooth surface, foil upward. and pour plaster of Paris over it; when hard, remove model, and you will have a good mold lined with tin foil. Dry this and heat; pour zinc or babbitt into it.

TO MAKE DIES FOR SMALL CASES WITHOUT MOLDING.

DR. D. W. BAKER.

Items of Interest, May.

The method in brief is to cast the dies directly on the model, which may be easily and quickly done as follows:

A plaster impression being taken, a plaster model is obtained. With the tip of the finger dipped in powdered soapstone rub the model till smooth; build a wall of moldine (potter's clay mixed with glycerin) half an inch high around the model, covering the teeth and all parts not to be covered by the plate; the parts to be covered by the plate will then be at the bottom of a well with sloping sides; in this well pour lead till it is even full; the lead should be poured just before it begins to cool; separate this lead counter from the model, and around it build the wall of moldine as before, leaving exposed only the surface to be covered by the plate; with a ball of cotton held in the pliers and dipped in powdered soapstone, dab the surface of the exposed lead till it is covered by a film of the fine dust; in the well thus formed pour fusible metal, separate, and swage as usual.

By this method no time is lost making sand molds, varnishing casts, and waiting for them to dry, and the results will be found exact and satisfactory in every way.

TO PREVENT PLASTER STICKING TO FLASKS.

Western Dental Journal, September.

Paint the inside of the flask with a solution of whiting, before investing.

CONTINUOUS GUM WORK.

MR. HARRY ROSE, ENGLAND.

British Journal Dental Science, June.

The impression having been taken and the model made in the usual manner, it is generally advisable to strike up a dummy plate

in German silver or other suitable metal, to test the suction and take the bite on.

It is of course very important to get good suction. Everything having been found correct, the next step is to obtain zinc dies and lead counters from the plaster model and strike up a platinum plate of about No. 5 or 6 gauge.

The plate should have a piece of thin platinum wire soldered along its edge to allow for smoothing, trimming, and relieving after the completion of the case, as otherwise an untidy edge would result.

Next the surface of the plate that is to be covered by mineral must be roughened; this can be done either with the corner of a flat sculptor or a graver, the former answering the purpose very well. The roughening should resemble that on a rasp, and when completed the surface of the plate possesses a nutmeg-grater-like appearance.

Small tags of platinum are then soldered on to the plate in convenient positions—i. e., where they will not come in the way of the teeth, and have a sufficient thickness of mineral over them. These furnish an additional source of union between the mineral and the platinum plate.

All soldering must be done with pure gold, as even the slight amount of alloy in coin gold is sufficient to discolor the gum enamel where they come into contact.

The teeth should now be mounted on the platinum plate with wax as in ordinary vulcanite work, leaving, however, a slight interval between each about the thickness of ordinary note-paper; the object of this will be explained later. Next try the set in the mouth and make any alterations that may be necessary. Making the sections is the next step and is accomplished in the following manner: Having previously boiled the model in stearine, make small cuts or grooves in the front and sides with a rounded sculptor; these serve as guides for the sections. Then place the case in situ, soap the front of the model and wax, mix up some plaster and build it out over the labial surfaces of the six anterior teeth, the waxed-up gum corresponding to them and the plaster model, forming, when set, a sort of shell of plaster holding these teeth in position. When this is hard it may be trimmed up whilst still in situ,

and then, after soaping it, similar sections can be cast on each side to support the molars and bicuspids.

These sections should extend to within about one-eighth of an inch from the tops of the crowns of the teeth.

The next step is to make the crown section, which covers the crowns of the teeth and embraces the upper edges of the other three. As this is usually rather fragile, owing to its shape, it is as well to strengthen it with a piece of stout iron wire. The sections are then removed, and the teeth and plate freed from wax; each section is then oiled, and that part which is to come in contact with the mineral body covered with tissue paper; this is done by wetting the tissue paper and applying it to the plaster by means of a soft camel's-hair pencil.

The sections are now placed in their respective positions on the model, and retained there by means of an elastic band. To give the mineral an additional hold to the plate, it is as well to brush it over with some gum enamel mixed thin with water. The mineral compound is mixed up into a paste with distilled water to which a little gum tragacanth has been added; this diminishes the friability of the uncooked mineral and makes it, therefore, more easy of manipulation.

Now place the molar and bicuspid teeth in their respective positions in the sections on one side and pack some mineral compound down beneath and around them.

That portion which is packed down to form the substance of the gum should be mixed somewhat thinner than the rest, so as to flow into place easily, whilst that encircling the necks of the teeth should be drier in order to retain them more firmly in their places.

The molar region of the opposite side should then be packed, and lastly the front teeth inserted and treated in the same manner.

The object of the slight space between the teeth will now appear. If the teeth had been mounted close together, it would have been impossible to have reinserted them from the back.

When the packing is completed the whole is placed in a warm situation and allowed to dry gradually, after which the plaster sections are removed, and the teeth will be found to be retained in their places, the mineral having taken the form of the original wax.

The set is now ready for the first firing, and should be gently removed from the model, placed in a fire-clay dish, and covered

with powdered silex. After gradually warming up to a good heat, it may be placed in the muffle of the furnace. The completion of the firing is ascertained by means of a piece of clay tobacco-pipe stem, carrying a small portion of the mineral, which is placed in the muffle in close proximity to the work; this is examined from time to time, and on its assuming a partially glazed appearance the work is known to be fired sufficiently, and is removed from the furnace and placed in an iron oven to cool down slowly, carefully protecting it from draughts.

It is then examined, and, if any flaws are present, it is as well to pack some thin mineral into them and subject the case to a second firing. The gum enamel is next painted on to about the thickness of a three-penny piece, and the case again placed in the fire-clay tray, but this time no silex or any other material must come in contact with the gum, as it will of course become immovably vitrified to it.

After firing, the case is again allowed to cool gradually in the oven, and if perfect the edges are smoothed, the plate polished, and it is then ready for the mouth.

ACACIA ADDED TO PLASTER FOR IMPRESSIONS.

Dental Record, May.

Mr. E. Lloyd Williams advocates the addition of a solution of gum acacia to plaster when used either for casting models or for taking impressions. When using it for the latter purpose, he adds about an ounce of the mucilago acaciæ (B. P.) to the pint of alum solution. For casting models slightly less is required. He states that this addition renders the plaster less friable and more dense, giving it a silky look.

IMPRESSION FOR METAL MODEL.

Western Dental Journal, May.

For a full impression in which a metal die is to be cast, mix one-third of either fine sand, marble-dust, whiting, or pulverized

quartz with two-thirds plaster. Slowly and thoroughly dry the impression, and pour the metal into it at its lowest melting point. This plaster, compounded, is also useful in difficult cases, where an impression should be allowed to get quite hard prior to removal in easily broken sections.

IMPRESSIONS OF PARTIAL CASES.

DR. B. H. CATCHING, ATLANTA.

When there are two or three teeth scattered about in the jaw, a good impression can be made by first placing a little wax in the groove of the cup (a round bottom cup will answer best) and pressing it in the mouth against the teeth, to mark their positions. At the mark of each tooth, cut a hole in the cup to allow the teeth to pass through. Take the impression with the quantity of material that would be required for an edentulous case. The teeth will force the material through the holes and allow the cup to pass up to close adaptation to the jaw.

If the impression is to be of plaster, and the teeth are in such position that the removal of the impression would be difficult, first, place a ball of soft wax over each hole, place the cup in the mouth, and press the teeth through the holes, which will carry the wax through; remove the cup, enlarge the wax impressions, fill with plaster, and take the impression. After the plaster has set, break the plaster-wax impression from around the teeth, remove the cup, place them in position and run the model.

GLAZIER'S PUTTY FOR IMPRESSIONS.

DR. W. S. ELLIOTT.

Items of Interest, March.

Ordinary glazier's putty, molded to the right consistency and perfumed with oil wintergreen, is a useful impression material for crown work, on which fusible metal can be cast with great perfection.

IMPRESSION TAKING.

DR. W. H. STEELE, FOREST CITY, IA.

The writer does not believe plaster to be the ideal impression material for full cases. He takes first an impression in plaster, removes and dries off thoroughly, scrapes sufficiently to remove the roughness, then molds over it a thin sheet of modeling compound and inserts in mouth when compound is quite soft, cooling with a syringe of cold water. By this means a model is obtained which needs no scraping to make the plate fit.

TO PREVENT DARK JOINTS.

DR. C. BOXTON, SAN FRANCISCO.

Pacific Coast Dentist, May.

Grind gum sections to fit closely, and, just before removing model from articulator, remove every other block and touch the joints with a little oxyphosphate, mixed thin; then replace the block and wipe off surplus cement with a clean napkin. By this method very little cement is used, and at the same time a perfectly sealed joint is had.

TO PREVENT RUBBER RUNNING BETWEEN JOINTS.

DR. J. G. TEMPLETON, PITTSBURG.

Dental Review, December.

To keep rubber from running between the teeth and joints in vulcanizing, after the teeth are set in the first half of the flask plaster, trimmed and varnished, pour water on all the teeth and joints, then mix a small quantity of pure plaster, have it rather thin and with mixing spatula cover labial and buccal surfaces, also the joints, take up the piece quickly and bring it near the mouth and blow rather sharply against the thin plaster all around, which will force it into all spaces between the teeth or blocks. After this finish flasking in the usual way, and, if possible, it is well to allow the case to remain over night in the flask before packing.

BABBITT METAL, FORMULA AND DIES.

DR. L. P. HASKELL, CHICAGO.

Ohio Dental Journal, December.

A few things to be remembered in the use of babbitt metal. While it is the only metal which has all the requisites for a dental die, viz.: non-shrinkage, sufficiently hard not to batter, sufficiently tough not to break, and making a smooth die, it must be made from a proper formula. In order to cheapen it for the purposes for which it is generally used, lead is substituted for the tin to a greater or less extent. This ruins it for dental dies. The proper formula is 1 part copper, 2 parts antimony, 8 parts tin.

Whenever a die cracks in swaging, it shows that there is a lack of tin. Overheating of this metal injures it, because of the tendency of tin to oxidize.

Pure lead cannot be used as a counter-die, because of its melting at a higher temperature than the babbitt and adheres to it. The melting temperature of the lead is reduced by the addition of tin—5 parts lead, 1 part tin. This should not be poured hot as it comes from the heater, but stirred until it begins to thicken and then poured quickly.

MODELS OF MARBLE DUST AND PLASTER.

DR. J. G. TEMPLETON, PITTSBURG.

Dental Review, December.

In vulcanite work the best results may be obtained by making models one-fourth marble dust and three-fourths plaster; also the same in flasking the case.

COVERING MODELS WITH TIN FOIL.

DR. B. H. CATCHING, ATLANTA.

Coat a sheet of No. 30 or 40 tin foil with shellac varnish, or what is better, liquid silex; press it down on the model, beginning in the roof, if an upper, on the lingual surface, if a lower; use a stencil brush to carry the foil down well, then smooth with a piece

of cotton. Burnish where there are folds or ridges. It is better to coat the foil than the model; the latter will absorb the silex before the foil can be carried down in places.

TREATING MODELS FOR ARTIFICIAL DENTURES.

DR. GRANT MOLYNEAUX, CINCINNATI.

Ohio Dental Journal, April.

The writer believes that it is the force of adhesion, rather than atmospheric pressure, that supports the denture. Proceeding on this line, he suggests the treating of models to best get close adhesion. He says:

In an artificial denture we have a uniformly rigid body. In the alveolar ridges and palate we have conditions anything but uniform. We find hard and soft spots arranged where they will be of least advantage. There is also the lower jaw playing over the superior denture at different angles, bearing harder on one point than another, the more compressible places giving way, while the plate rides on the harder points and loosens.

A denture may be ever so perfectly adapted for speaking purposes, but when the opposing teeth strike it at different angles, as in mastication, the plate will begin to tilt and loosen, which proves that an adaptation for talking is not necessarily one for masticating. We have seen plates tried for their "sticking" qualities by pulling on the anterior teeth. There is an exhibition of the force of adhesion under the most favorable circumstances, as all hard parts are relieved and the retention is that due to contact between mucous tissue and the plate. If pressure were exerted in the bicuspid region or anteriorly, the denture might not stick so well.

Now, with a view to obtaining the greatest retention in superior dentures, one or all of four forms of treatment in the model may be necessary.

First. Treatment to relieve pressure on the hard parts, by thickening the tissues over these points.

The hard parts are usually found in the median line of the palate, and over the ridge corresponding to the position of the two

bicuspid and first molar teeth, called buccal region. The tissue over the regions corresponding to the six anterior teeth and at the tuberosities is generally more compressible.

The amount of relief over the hard parts would be governed by the compressibility of the softer portions.

Second. Treatment to produce as much horizontal surface as possible.

Third. Treatment to restore the model to the size of the mouth, or as nearly as possible.

Fourth. Treatment by relief, to produce in extremely hard, flat, or angular mouths a thickening of vascular tissue, over the

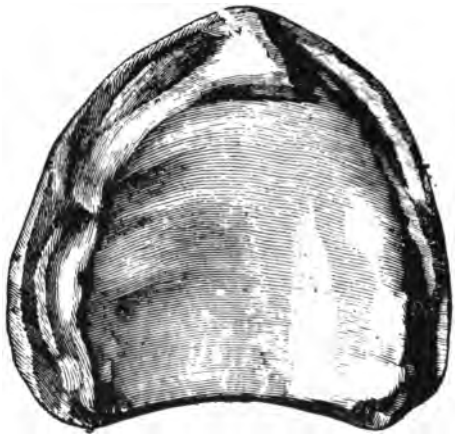


FIG. 1.

entire palate for the purpose of obtaining more moisture, and a soft elastic padding for the denture to rest upon. Incidentally, reliefs are applied to models for the purpose of preventing pressure on points undergoing absorption, as well as points tender from surgical operation; also, to protect models from influences that might injure the model during the process of constructing a denture. In brief, we desire to obtain a uniform padding of vascular tissue under the denture, that will prevent fulcrums and friction on the hard parts of the ridge, and the consequent injury resulting from this continual irritation. Also, to obtain all the horizontal surface possible. The paper can be better understood by referring to some practical cases.

Fig. 1. This is a flat mouth, all horizontal surface, and thickly

padded with soft tissue over ridge, median line, and entire surface of palate. There is nothing to be done to this model in way of reliefs, for there could be no improvement. A denture made for this case will be worn with unusual degree of satisfaction, providing there is a fair occlusion with opposing teeth. The only treatment that we would suggest would be the tinning of the model with No. 40 foil to protect it in case of a vulcanite denture.

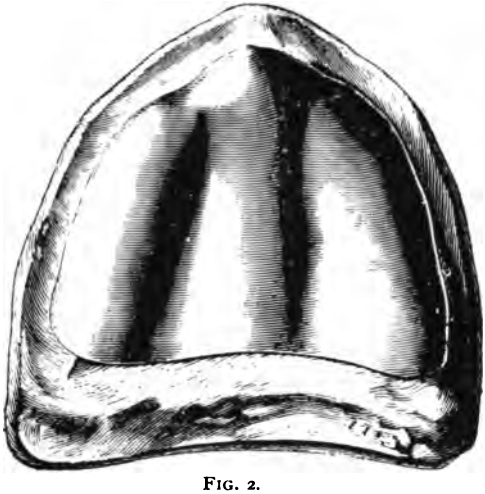


FIG. 2.

Fig. 2. This is also a flat mouth, representing more horizontal surface than Fig. 1. But in place of the soft vascular covering to the ridge and palate, we find the mucous membrane almost without color, it is so thin. It is also very dry, having a glazed appearance and the buccal and labial side of ridge offers no assistance to support the denture, as this is angular.

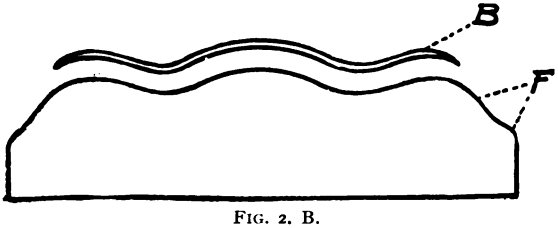


FIG. 2. B.

This patient tried a number of operations but without good results. The plates when moistened would adhere fairly well for speaking, but even then would frequently drop. The treatment

for this case, according to our paper, was to extend a relief over the entire palate of about 26 gauge, which terminated at the junction of the palatine, with the labial and buccal surface of the ridge, and posteriorly at a line where the tissue was soft. The extent of this relief is shown in Fig. 2.

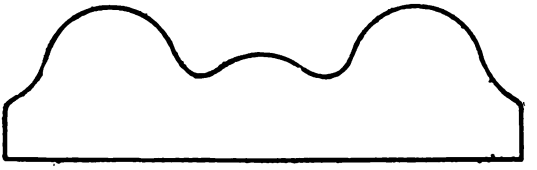


FIG. 3.

Fig. 2 B is a vertical section of Fig. 2, and shows the relief B raised from the model.

The effect of this treatment was to bring positive contact at the circumference of the plate between the dotted line F, and to extend the plate as high as possible at the incisive and canine fossæ and over each tuberosity. The space occupied by the relief B was soon filled with tissue, and an excellent adhesion was the result.

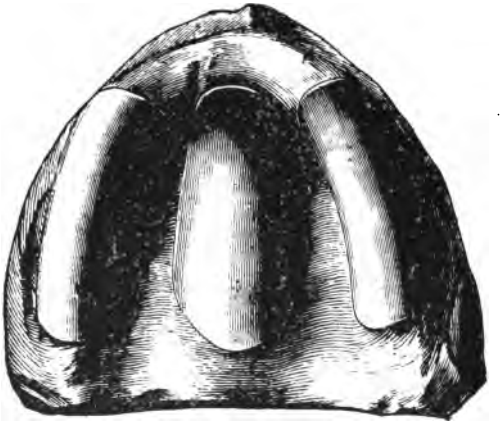


FIG. 3 A.

Fig. 3. This is a model that first would appear simple, yet it was the source of much trouble to several operators. The trouble was not the lack of horizontal surface, but the uneven distribution of soft tissue and the resulting fulcrums. Anteriorly and posteriorly the mouth was soft, while in median line and buccal region the tissue was almost white it was so thin.

The treatment of this case was to pad the three hard points by placing relief as indicated in Fig. 3 A. As the space between the lateral and central relief in this case is very slight, and as the application of three reliefs would make several edges to irritate the tissue, we would suggest that the case be treated as in Fig. 3 B, with one relief covering the three points indicated in Fig. 3 A.

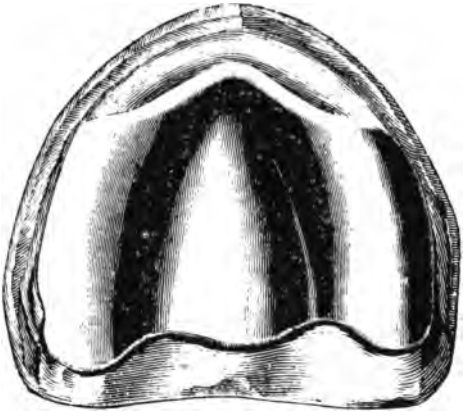


FIG. 3 B.

Fig. 4. This is the vertical section of a V-shaped model, and will be recognized as one of the most difficult mouths in which to obtain a satisfactory degree of retention.

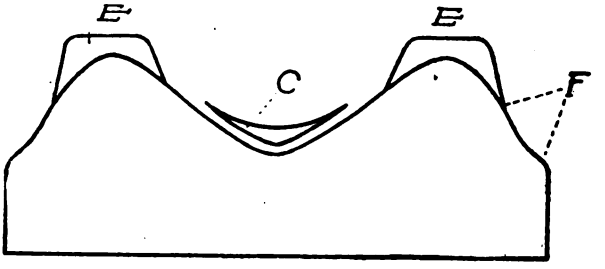


FIG. 4.

The manner of treating this model is shown in Fig. 4. The reliefs are adjusted; first, to prevent pressure on the least compressible portions; second, to create horizontal surface over the angles as shown by the shape of the reliefs in the diagram. By placing reliefs of uniform thickness as shown in Fig. 4 A, we prevent the pressure of the plate on these points, but we do not

materially improve the conditions for adhesion as regards horizontal surface. The combined horizontal surface of E E C, Fig. 4, is quite that of the average mouth, and we have reason to believe, other conditions being equal, that a fair degree of retention will follow. These reliefs have been somewhat exaggerated in the drawing; it was not intended for them to appear quite so heavy.

Treatment to restore the model to the size of the mouth is advocated for vulcanite. The great trouble with vulcanite plates is that they are generally too small for the mouth, and that "misfits" are due to the fact that some mouths cannot be forced into the plate.

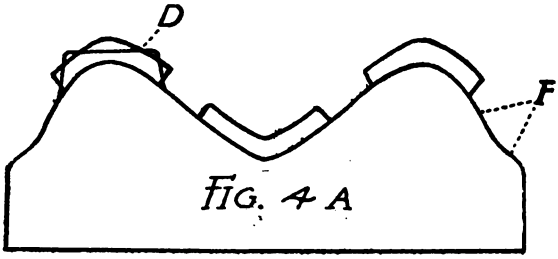


FIG. 4 A

It is quite often that when a denture is first inserted that it will not readily go to place. The dentist helps matters along by vigorous stroking of the lingual surface, all of which is to crowd the mouth into a plate that is entirely too small for it. Such a denture cannot be worn without injury. From the time we take the impression, both by our own acts and those changes that take place in the materials with which we are working, we are getting farther away from the size and shape of the mouth, and a certain amount of alteration is necessary to prevent these changes from affecting the adaptation of the plate.

We have long advocated the use of No. 40 tin foil over the models for vulcanite, and we know that if every vulcanite plate were made on a model tinned with No. 40 foil, that infinitely better results would follow than by the use of silex or collodion. When reliefs are to be placed on the model, they should be placed first, and the foil stenciled over them and the model.

The foil answers another purpose. During vulcanization, when the rubber is expanding with great force, followed by its subsequent contraction and shrinkage, the model is protected from injury. The

reliefs spoken of are formed of block tin and tin foil, ranging from No. 40 foil to block tin of 20, and even 18 standard gauge, in thickness. They are placed on the model as indicated by an examination of the mouth. The edges are beveled and no abrupt margins left to irritate. The tissue, thickened in this manner, after a time becomes permanent, and remains healthy.

We have never seen a case where the judicious use of reliefs ever produced harm. On the contrary, the patients who have experienced trouble appreciate to the highest degree this careful attention. It is not infrequent to find operators of years' experience claim they have never used air chambers, who, at the same time, tell how they shave the impressions.

Now it does not make any difference whether you shave the impression or add to the model, the results are the same, though the object of the operators may be different.

We do not approve of the old-fashioned vacuum cavity with its sharp edges, as its only action is one of relief, to prevent pressure on the hard parts, and after these parts have been relieved let the edges be drawn out so that they are continuous with the model and not to be seen or felt. The form and thickness of reliefs are to be modified according to the material used in constructing the base of the denture, and to the conditions found in the mouth, and its shape.

A model for vulcanite or cast aluminum might require a little different and more extensive treatment than a model for a gold plate. A model for continuous gum would be different from either of the foregoing, but the principal involved in each case is the same.

We approve of adding to the model because the changes can be made more accurately and the reliefs can be blended off with the model so that their margin cannot be distinguished, and consequently mechanical irritation will not occur.

TO PREVENT PLASTER STICKING TO PLATE.

Dental Review, December.

Just before packing, coat the model with thick lather of soap, says Dr. J. G. Templeton.

FUSIBLE ALLOY BASE-PLATE.

DR. T. F. CHUPEIN, PHILADELPHIA.

Dental Office and Laboratory, July.

After taking the impression it matters not with what material, so the impression be correct—yet we strongly advise plaster of paris—the model is made. If the plate be for a vulcanite set, when the plaster is filled into the impression and built up above it, say about one-half an inch, it is inverted on a glass slab, and the edges are made flaring, in the same manner as we would do to form the model in case we designed to make a metal plate. When the model has hardened and is removed from the impression, it is trimmed as illustrated by Fig. 1. The form of the plate is then traced on the face of the model, and a wax base-plate is neatly fitted to it, as also shown by Fig. 1. This being done, all that part of the model which is not covered by the wax base-plate is varnished with shellac varnish, and a gate or inlet cut into the model, as also shown by A, Fig. 1. Two little air-vents are also cut at the heels of the model, as shown by B and C, Fig. 1. The wax base-plate and all the shellacked part of the model are now coated with fine French chalk rubbed over all these surfaces, in small quantities, with the end of the forefinger. The use of the French chalk must not be excessive, but must be thorough, so that a smooth gloss or coating will be imparted to the wax base-plate and shellacked part of the model. Modeling compound is now softened in hot water and formed into a ball. This is then placed on the palatal surface of the wax base-plate and so manipulated with the fingers that all surfaces of the base-plate, as well as the best part of the model, are covered with it.

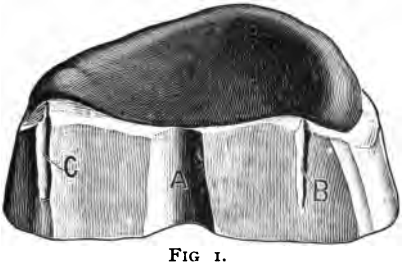


FIG 1.

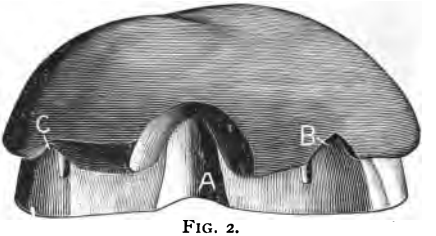


FIG. 2.

This is shown by Fig. 2. This may then be permitted to harden, or be put in a basin of cold water, so that the modeling compound will be thoroughly chilled. When the compound is thoroughly hard it is removed from the model and base-plate. If the base-plate adheres to it it can be easily removed. The inlet A, Fig. 1, which was cut in the model, has a corresponding protuberance in the modeling compound. This is cut away so as to give a free inlet to the face of the model, and the two vent holes which were cut in the model are dressed off from the modeling compound, as shown by Fig. 3, B and C. The wax base-plate being removed from the model, the compound is placed over the model, which it accurately fits, and the two parts are firmly tied together with twine. It is then put in the sand box and surrounded on all sides by molding sand, except the vent to pour the metal in and the air holes. Crown metal (a fusible metal) is then melted and poured into the inlet A, Fig. 1. As the metal takes a little time to cool, it should not be disturbed until perfectly cold, but if hurried it may be removed from the sand box and placed in a basin of water as soon as the metal is observed to chill at the vent hole.

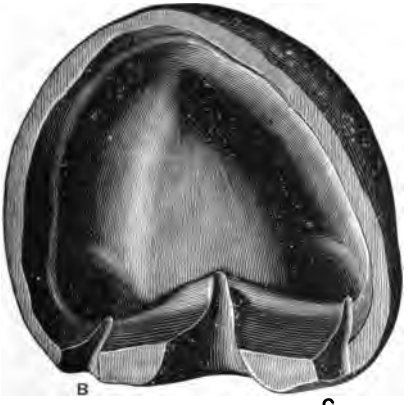


FIG. 3.

It will be found that the modeling compound, No. 3, is well adapted for this purpose, as it takes a greater degree of heat to soften it, and consequently the melted crown metal has no effect on it. It is well before pouring the alloy to rub French chalk also over the inside of the modeling compound, Fig. 3. The process takes some time to describe, but the whole manipulation from the time of taking the impression to the laboratory, does not consume more than thirty minutes. A plate made in this way may be used for taking the bite, and on every occasion in which I have placed such plates in the mouth they have adhered firmly to the gum, so that it is to be presumed that if this plate fits the impression must have been correct, and that the vulcanite substitute will fit also.

CLASP PLATES.

DR. JOHN G. HARPER, ST. LOUIS.

Items of Interest, October.

There are no objections to clasps if properly made and adjusted.

The first step in the operation of making a clasp plate is to obtain a model of the tooth to be clasped, which may be taken in modeling compound or wax; an impression may be taken with moldine and a metal model made.

The model secured, the next step is to make a pattern for the clasp, using cardboard for the purpose. The clasp should be wide, so as to clasp the tooth firmly. If you should wish to hold anything firmly in the hand, you would not clasp it simply with the thumb and finger, but with the thumb and all the fingers, and with both hands if the object to be held was large enough. The clasp should embrace the whole crown when permissible. The metal best suited for clasps is composed of a five-dollar gold piece, to which is added a ten-cent silver piece, and rolled to 24 of the gauge plate. This clasp metal has the proper spring, and does not lose that property when heated in soldering, and can be soldered with 18k. solder when used on a gold plate.

The paper pattern is used to cut out the proper shape of the metal, then the clasp is properly fitted to the model by commencing at one end of the clasp and carefully bending the metal, trying on the tooth, proceeding till the clasp fits the model, filing away the clasp so as to accommodate the festoons of the gums. The clasp is now ready to be tried on the tooth and further adjusted if necessary.

If the clasp is for a rubber plate a stay should now be soldered on the lingual side of the clasp; these stays may be made of nickel by simply rolling a nickel to 28 of the gauge plate. A piece of the nickel of the proper width and half an inch long is taken, some holes made in it, and fitted to the clasp by slightly bending. Instead of placing the stay at right angle to clasp, attach it at about forty-five degrees, bending the nickel to fit the clasp instead of filing it to fit; this gives a firmer attachment.

The clasp is now ready to be smeared on the inside with a sticky wax made of equal parts of beeswax and rosin. A little of the wax should also be placed on the stay to fill up the space be-

tween the stay and the palate or gum. The clasp is now placed on the tooth, any surplus wax removed, and firmly set in its proper position. Select an impression cup; that does not touch the clasp or stay; take the impression in plaster; let set firmly; remove by gently loosening and carrying it away from the teeth in the direction of the long axis of the teeth. Usually the clasps come off in the impression; if not they should be removed and properly set in the impression; remove the wax from the inside of the clasps, being careful not to disturb the wax on the stay, as this is a part of the impression. Prepare the plaster impression for the pouring of the model, allowing none of the parting material to cover the inside of the clasps. The plaster for the model is poured; allowed to harden; the impression removed, and you have a model of the mouth with the clasps held firmly in position, and are ready to go on and make the plate. Fourteen karat solder may be used for the rubber plate, as the solder is covered up in the vulcanite.

These clasps may be used on gold plates. The best results are obtained by first fitting the gold plate to the mouth, then placing the clasps in position as indicated in the foregoing. The plate may be held in position by the use of a little sticky wax. The impression is taken with the plates and clasps in position.

A model is made of a mixture of plaster and marble dust or sand; after removing the impression you have a model of the mouth with the plate and clasps in position; dry out and solder the clasps to the plate, using 18k. solder, only tacking the parts together, using but little solder, so that in case the clasps are not correctly adjusted they may easily be removed. The completion of the soldering can be done at the time of soldering on the teeth. The plate, with the clasps now attached, is ready to try in the mouth. If all is correct, proceed to get the bite, and attach the teeth in the manner preferred.

RAPID METHOD OF MAKING PARTIAL GOLD PLATES.

DR. S. S. STOWELL, SPRINGFIELD, MASS.

Dental Register, March.

Take an impression in plaster or any of the modeling compounds, into which pour Mellotte's metal (as cool as it will flow).

Then blacken the male die by burning a match underneath it to prevent the counter die from sticking to it. Then build up the edges of the die to form a cup, into which Mellotte's metal is poured to form a counter die. Two or three thin plates, gold No. 32 gauge, are swaged separately, and placed together and swaged again, after which the thin plates are soldered together. In this manner any thickness of plate required can be made. The writer claims better adaptation to the mouth can be made in this manner.

FIRST BICUSPID LEFT OFF IN PLATE MAKING.

DR. J. W. GREEN.

Items of Interest, May.

Says, in making full sets of teeth, he nearly always leaves off the first bicuspids so as to throw the molars further forward. Better use large jaw teeth and fewer of them. If the first bicuspid is needed to fill the arch, put it behind the second molar. Especially in lower sets he wants large molars, so that in chewing there can be more latitude for grinding instead of mashing food.

REFITTING AN OLD PLATE.

DR. DAVENPORT, NEW YORK.

International Dental Journal, March.

A lady who had been for some years wearing a full upper denture recently consulted him because the plate would not keep its place while eating or talking. While the plate fitted accurately and had good suction when it was made, it had recently—the mouth being very soft—become exceedingly loose, and it seemed imperative at first to make a new plate, very much against the wish of both the lady and himself, for the proper arrangement of the teeth in her case took a great deal of time. As it happened, she possessed a full upper rubber plate, which she had not worn for a number of years, and the teeth upon that plate were entirely satisfactory to her in appearance, but of course the plate did not fit. He

suggested experimenting with the old plate, to see if it could not be so changed that it would answer her purpose without much expenditure of time. A plaster impression of the mouth was taken, the band of the plate was cut down almost to the teeth, and the entire center cut out, so that nothing was left but sufficient rubber to hold the teeth in place. This being placed upon the plaster cast and waxed up as usual, was next tried in the mouth and slightly changed to obtain the correct articulation, after which it was finished in the usual way. The result was satisfactory, and the whole thing was accomplished with a very small expenditure of time. Very often, with people over forty years of age, duplicate plates will accumulate, and often it may be possible to make those changes easy for patient and operator, and still bridge the patient over a number of years.

REFITTING PLATES.

DR. J. R. PAGIN, VALPARAISO, IND.

Dental Digest, October.

Take impression and make the cast in the usual manner. Set the old plate on the cast. It will fit sufficiently well to give proper antagonism of the teeth in the finished case. If there are any marked undercuts, cut off rubber on old plate so that it can be placed on cast accurately without marring same. Remove the teeth from the plate carefully. This can be accomplished without springing the plate by heating the teeth one at a time and gradually in the flame of a spirit-lamp. There is no necessity for checking the teeth. Now with a file or engine bur cut away that portion of the rubber which immediately surrounded the pins. Then set the teeth back on the rubber in their original position, and replace with wax the portion of rubber cut away. Invest in the usual way, separate and remove wax and old rubber, and pack entirely with new rubber.

If the plate fits well, do not take a new impression, but let the old plate answer that purpose. Always remove all the old rubber, for it is just as easy to remove all as part of it, and the work is certainly more artistic and substantial and more satisfactory to both patient and dentist.

BLACK RUBBER PLATES TO MAKE JET BLACK.

DR. J. L. CHAIM.

Dental Cosmos, February.

Bisulfid of carbon will change the brown color, so often seen in the so called black rubber plates, to a jet black. It is a transparent, colorless fluid, which has a penetrating and very disagreeable odor, a taste which is acrid and somewhat aromatic, so that it will be found necessary, after allowing the plate to stand for a few moments in the bisulfid, to put it in water to remove the nauseating effects and odor.

LINING RUBBER PLATES WITH ALUMINUM.

DR. T. R. PIXTON, PHILADELPHIA.

Items of Interest, May.

Buy the metal in bars, ten or twelve inches long by about one inch thick, saw them in lengths of two and a half inches and three inches. These are then rolled cross-wise till reduced to 28 gauge, this being, after repeated trials, found to be the best thickness for the purpose. You now have the metal ready for lining. The metal will be hard from rolling, but cut a piece off too large for the cast, for you need not be economical with this as with the gold; leave plenty of material to work on, as the cost is only one cent per plate. First anneal the metal; some think that on account of the softness of the metal that it can only be annealed by dipping in oil, igniting it, and holding it till it is burnt off. This is a dirty and bad-smelling method. Any one who is expert with the blow-pipe can do it by blowing a slow, broad flame till the metal becomes white, like unburnished silver. If you heat it to a red heat the metal will burn and become worthless. A few trials will soon make you an expert annealer. Now take the cast, which must be hard and dry; place the aluminum on it and with the thumbs press the metal down in the cast. Then commence to burnish it in shape. The best tool for this purpose is a bone tooth-brush, the handle of which comes to a nice rounded point and, with soap and

water for a lubricant, in a few minutes you can burnish the whole palatal surface to shape. Anneal again. Hold the plate well in the cast and commence to burnish from the palate on the top of the ridge. Never forget that whether hammering or burnishing you must commence from the center and stretch the metal to the outer edge, otherwise you get folds that will be hard to get out. After having the plate well burnished on the palate and ridge, hold the plate firmly with the fingers and commence folding over a little at a time and evenly all round to prevent folds. With a little practice and not losing patience you can make a very close-fitting plate equal to being swedged. Now prepare it for adhesion to the rubber. This is done with a sharp enamel chisel. Hold it at an angle of about twenty-five degrees and make an incision a thirty-second of an inch long, turning up the metal in the form of a hook. Do this all around the edges and over the palate. Then cut around in the opposite direction, forming a double hook. These are small, but quite sufficient to hold the rubber. Now anneal the plate for the last time to make it soft, so that if it is not a perfect fit the pressure of the rubber while screwing the flask down will force the metal tight all around the cast, and make it a tight fit. Set the teeth upon wax, and proceed in the usual method, as in making a rubber-plate.

REMODELING OLD RUBBER PLATE.

DR. W. A. ROBERTSON, CROOKSTON, MINN.

Dominion Dental Journal, April.

After taking a perfect impression in plaster and securing cast, with a saw remove the palatine portion of the plate to within one-fourth of an inch of the teeth; then file down the outer margin as close to the teeth as possible; place the remainder upon the cast and wax. Invest in flask, and when hard, after washing out the wax, place over the stove of vulcanizer and heat up thoroughly, and, with a strong pair of pliers, grasp the one end of the old rubber and it will leave the teeth readily. If any of them draw out of the plaster, replace, and, after removing all traces of the old rubber,

pack and vulcanize as usual. Remove the teeth and cleanse by boiling in commercial nitric acid, which will remove all traces of the old rubber and any traces of organic matter or stains from them.

REPAIRING RUBBER PLATES.

DR. A. B. CRAWFORD, GRAND RAPIDS, WIS.

Dental Digest, August.

Warm some wax and lay on a flat surface, then put parts together, teeth down, and press lightly into the wax. It is then easy to see if the parts come together correctly. Run full of plaster and, if a lower plate, put a stiff wire, bent to fit, into the plaster to stiffen it. When plaster is hard, remove from the wax bed and scrape away the old rubber from a quarter of an inch back of the break, down to an edge at the break, then varnish with rubber varnish and let it stand at least two hours to dry. Then press on new rubber with a warm instrument, invest, vulcanize, and finish. By this method undercuts will cause no trouble.

TO REMOVE STAIN FROM RUBBER PLATES.

Mix fine pumice stone and alcohol, scour the spots with it.

TO TRIM RUBBER PLATE.

DR. J. G. TEMPLETON, PITTSBURG.

Dental Review, December.

In finishing plates always trim the rim low over the bicuspids, leaving it high as can be worn over the cuspids, and the same over and back of the second molars; do not file rim to a knife-like edge, slightly bevel inside of rim at the top, extending down about three-sixteenths of an inch.

TO TEMPORARILY ATTACH TOOTH TO RUBBER PLATE.

Ash's Quarterly Circular, March.

To temporarily attach a tooth to a rubber plate, Mr. Lennox says, cut an anchorage where the broken tooth was, fit a new one, hold it with the finger, melt fusible metal in the anchorage, and press it in with the thumb. A tooth thus attached will stay several weeks or months.

SUSPENSION DENTURE.

DR. C. L. ALEXANDER, CHARLOTTE, N. C.

Dental Cosmos, December.

A suspension denture consists of an anterior part made of porcelain facings, and a posterior part made of gold or other suitable material. When these parts are placed in the mouth and secured together, the denture is retained in position by close adaptation to adjoining teeth, and further supported by metal posts set in the lingual surface of the adjacent teeth.

FIG. 1.

FIG. 2.

After preparing the holes for the gold post in the lingual surface of the teeth, the first step to be taken in constructing a suspension denture is the selection and adjustment of a porcelain facing or facings, as the case may require.

If only one tooth is to be replaced, we will find it preferable to grind and adjust the facing to the natural teeth in the mouth. By doing this we are assured of a more perfect adaptation. The facing should be broader than the space to be supplied, thus allowing it to slightly overlap the adjoining teeth. The facing is then backed up with gold (28 gauge) in the usual way, and placed in position in the mouth, and an impression taken from the lingual aspect. Before doing this, however, we should place what we term

a guide post in the holes made for the reception of the metal post. The guide post will come out with the impression, and aid in the construction of the metal work. Before making the model, consisting of marble dust and plaster, the gold backing is placed in position on the impression, and a staple of fine binding wire is introduced through the holes made for the platinum pins (Fig. 1).

The model secured in this way is provided with gold arms, extending from the backing to the guide post and engaging them, also with a gold band encircling the holes through which the wire staple has been introduced (Fig. 2).

FIG. 3.

FIG. 4.

After bending the ends of the wire down upon the band to hold it in position, the little inclosure is filled with the investing material, which prevents the solder from flowing in. By soldering in the usual way the parts are all united, and, when finished up, the piece is adjusted to its place in the mouth, the gold posts having already been secured in the holes made for their reception. A little cement mixed quite thin should always be smeared within the holes and upon the screws before inserting them. When the facing has been placed in position the pins are bent down within the little chamber, to secure the denture in its place (Fig. 3). The piece is finished by filling the chamber with some suitable material. I prefer to fill over the pin with cement, then finish up with amalgam made as dry as possible.

ADAPTING SWAGED PLATES TO THE MOUTH.

DR. T. E. POWELL, CHICAGO.

Dental Review, December.

In writing on plate work, he speaks of swaging aluminum plates and fitting them to the mouth. The method will apply to any swaged metal. After the plate is swaged it is tried in the

mouth; a finger is placed in the vault of the plate, and with a pumping motion the adaptation is tested. If imperfect at any point the saliva will be forced out with a squirting noise, and by watching closely the place where the saliva is ejected its location can be readily detected. To remedy this defect the plate must be again placed on the model and burnished until repeated trials with the pumping process will prove that the bite is absolutely perfect. If the metal base is always fitted in this manner the plate will adhere to the surface, no matter how flat the mouth may be.

ARTICULATING UPPER PLATE WITH LOWER FRONT TEETH.

Western Dental Journal, October.

It is often very difficult to make a full upper denture work satisfactorily when the patient has only the four or six lower anterior teeth. If only the upper set is to be supplied, in adapting the teeth to conform to the lower teeth, leave room for the lower teeth to pass inside of them without touching, thus preventing tipping at the back. Have the lower teeth bite upon a shoulder of rubber built upon the upper plate, from the pins of the teeth back about one-eighth of an inch. When the vulcanite is thus used for a masticating surface use only the finest rubbers.

BEADED OR GROOVED VULCANITE DENTURES.

DR. W. STORER HOW, PHILADELPHIA.

Dental Cosmos, July.

The writer says the use years ago of wire soldered around the cut-out vacuum chambers in gold plates to prevent irritation of the tissues led him to adopt or imitate it in vulcanite work by scraping or grooving the plaster model, as in Fig. 1, so that the vulcanized denture should have an integral half-round smooth bead formed on its vault aspect, as in Fig. 2. Then followed the device of scraping a groove across the palatal portion of the plaster model and along

the buccal and labial lines of muscle attachments, to form a bead inclosure which should produce a supplemental chamber-like function of nearly the entire inner surface of the denture (see Figs. 1

FIG. 1.

and 2). The result greatly increases the hold of the plate on the gums, especially noticeable in cases having flat and soft surfaces.

Partial dentures, like Fig. 3, may thus be securely retained, and the simplicity of the process is hardly less remarkable than the successful result. It is only essential that the scraper shall be shaped

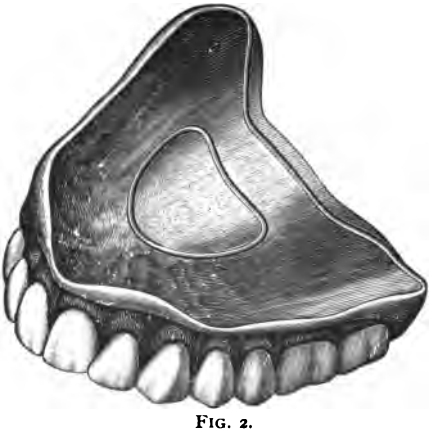


FIG. 2.

FIG. 3.

and operated to produce a suitably smooth, narrow, half-round groove in the model, and follow previously studied lines along the palatal soft parts and at the merging of the muscles in the gums. The inclosures may be of any size or shape or number that a care-

ful preobservation of the character and conformation of the mouth may indicate. If experience proves that the beading is too prominent at any point, ready relief may be obtained by smoothly reducing the projection at that point; but first allow time for the settling of the denture before taking off portions of the bead. In most cases, no chamber will be required other than the beaded inclosure, and this is a matter of considerable importance when a shallow vault and short teeth make a thin plate necessary for the proper production of speech.

FIG. 4.

In some instances, an alternative cutting of grooves in the vulcanized plate may be indicated, and that can readily be done with a round or oval engine bur, taking great care to smooth the edges of the grooves. These are especially effective in lower dentures, which may thus be given a really adhesive hold in cases otherwise most difficult of retention. When grooves are employed, strict cleanliness must be earnestly enjoined, else the foul grooves will become a source of irritation, a defect not incident to properly formed beads.

An example of duplicate and triplicate bead-inclosures is shown in the plaster model, Fig. 4, which exhibits a shallow vault having a hard anterior center with depressions on either side of the hard center. The bead lines follow the soft borders of those depressions. A further reinforcement of the retaining function is effected by a posterior bead-inclosure just within the junction of the soft with the hard palate, as previously shown. The denture thus constructed will be found to be very securely retained.

If for any reason a chamber is deemed desirable, it can easily be made, after vulcanization, by deepening the bead-inclosure with an engine bur.

In some instances, combined beads and grooves may be employed, and in any case obvious advantages will be found to follow the adoption of the previously described methods and devices.

TO EXHAUST AIR FROM UNDER AN UPPER PLATE.

When the plate is placed in the mouth tell the patient to close the mouth and swallow. The action dilates the thorax and closes the posterior nares, which exhausts the air from the mouth.

REFITTING VULCANITE PLATES.

DR. J. E. DAVIS.

Items of Interest, August.

Take an impression; run a model; set the old plate on it. Attach it to an articulator; build plaster on the opposite half of the articulator till the grinding surfaces of the teeth are imbedded. After the plaster is hard, separate the teeth from the plaster, remove the plate from the model, remove the teeth from the old plate, clean them thoroughly, place them in the imprints in the plaster on the articulator. Cover the model with base plate, close the articulator and wax the teeth in position. This replaces the teeth in their exact original position on the new plate.

STRENGTHENING VULCANITE PLATES.

MR. C. R. MORLEY, ENGLAND.

British Journal Dental Science, March.

Having prepared the plaster model in the usual way, prove it to be correct, and then proceed to set up the teeth as for a plain vulcanite upper; try the plate in the mouth to see that the bite,

position of the teeth, etc., are correct; then place it on the model and take plaster impressions of the fronts of the teeth. Having obtained these, take the temporary plate to pieces, and fasten the teeth in the fronts with a little wax, and we now have the relative positions of the teeth and model to each other. If it should be necessary to ease off the finished plate down the center of the palate, where the two halves of the superior maxillæ join, take a strip of Ash's soft metal, of the size and thickness required, burnish it to the model, and wax in place. Now, take a zinc die and strike up a copper plate, No. 2 in thickness, a little larger than it is intended to make the vulcanite plate. Upon this copper plate strike a perforated dental alloy plate, No. 7, and over this a tin plate, No. 10. The dental alloy plate and the tin plate must each be smaller than the copper plate. The dental alloy plate may sometimes turn comfortably over the ridge of the jaw but more often running round the alveolar border, a little within the palatal aspect of the teeth, as shown by the fronts, and the tin plate will be of such a size as to clear the angle and all the teeth. Round the perforated dental alloy plate, under, or a little within the pins of the teeth, a strip of strong, plain dental alloy plate should be soldered at right angles. I usually make the perforated plate about three-quarters of an inch wide, and to extend from the first molar to the first molar; the bar may be prolonged to a point between the pins of the first or second molar, so that the metal plate does not end opposite the division between two teeth.

We now have on the plaster model, first a copper plate, then a strengthened, perforated dental alloy plate, and over this a tin plate covering the palatal portions of the above plates. Upon this base, wax up the teeth to the same extent as if you were attaching teeth by means of vulcanite to a gold plate, because the palatal portion is formed by the copper, dental alloy and tin plates and no wax must be allowed there. Proceed to flask, using a three-part flask. One part will contain the model, the center portion the teeth, and the third section the plug. Before separating the first and center parts of the flask, it will, of course, be necessary to wash away all the wax. You will note the three-part flask is necessary to enable you to take away the copper plate. The packing is very important. In the first case—i. e., where the plate turns over the ridge—it will be necessary to pack from both sides, packing the palate side first,

then closing the flask with the tin plate in position; then open the plug portion and complete packing. In the second case, bolt together the portions of flask containing the model and teeth, having previously, if you like, packed a little rubber between the teeth labially.

In another case where the front teeth are fitted upon the gum, and it is intended to use a two-part flask, covering in the teeth, all the plates must be reduced in size by cutting them clear of the backs of the teeth, in order that they may lift out of the flask.

Cut a piece of rubber the shape of the perforated plate, but smaller, and squeeze it out very thin between two pieces of linen put between two strips of tin under the screw press, and line the palatal side of perforated plate with this. Place on the model and close the flask with the tin plate inside. Heat up the flask and very carefully close right home.

If the above directions have been properly carried out, we have the perforated plate in the same position on the model as before, only the copper plate is replaced by vulcanite. We now open the plug portion of the flask, take out the tin plate, finish the packing and vulcanize in the usual way.

In finishing, care must be taken to remove as little vulcanite as possible, or else you will get the perforated plate showing.

The method of strengthening partial uppers is in a great many ways the same as for full uppers; but instead of using the bar at right angles, strike upon the perforated plate a piece of plain dental alloy plate, No. 8, about an eighth or a quarter of an inch wide. This plate runs round the labial edge of the perforated plate and is soldered solid to it. It is advisable to leave a space of about one-sixteenth of an inch between the necks of the natural and the heels of the artificial teeth and the strengthening plate. In some cases it is an advantage to back some or all of the teeth and to solder them on to the strengthening plate, and also the clasps. This can be done quite satisfactorily, but great care, especially where the artificial teeth fit on the gum, is necessary in the flasking, and above all in the packing and closing of the flask. If the latter process is carelessly carried out we may have failures, such as the teeth not fitting on the gum, the bite being raised, etc. Where the teeth, clasps (if any), and plate are all separate it is only necessary to use a two-part flask unless the bite is very shallow and you cannot

pack through under the teeth. Where the teeth, clasps, and plate are soldered together you will be again obliged to use a three-part flask; the teeth, plate, etc., being in the middle section. You must pack from both sides, lining the palatal side of perforated plate with thin rubber. Gently close the flask by hand, and the tin plate being in position heat up and close right home. Before opening the flask bolt sections 1 and 2 together—i. e., the portions carrying model and teeth—then run over the plug and tin plate and complete packing.

RELIEFS INSTEAD OF AIR CHAMBERS.

Dental Cosmos, October.

Dr. L. P. Haskell, in writing on this subject, says: As a rule it is rarely ever necessary to make any other change in the plaster cast than a slight relief over the hard palate, so that the plate will not rock, as that is the only portion of the upper jaw which never changes nor yields to pressure.

PACKING RUBBER DIRECTLY ON THE MODELS.

MR. W. SUNDERLAND.

British Journal Dental Science, December, '94.

Although it is not absolutely necessary to obtain two models of a mouth for which an artificial piece has to be made, yet to him it is a desideratum to which considerable importance is attached.

The second model is always taken from the first, and used for the bite, and also for mounting the teeth in wax. The first is used exclusively to pack the rubber on. Since the manner of procedure is slightly different in partial and edentulous cases, he, for the purpose of simplicity, assumes a plate is to be made where no artificial gum is necessary and where some of the natural organs are represented on the model.

If it is desirable to try the teeth in the mouth, they are set up on a wax base-plate, and when the fit in the mouth is obtained,

the first model is cut in certain places for the reception of the neck of each artificial tooth in order to ensure a close fit to the gum. When clasps are necessary for the retention of the plate, they are adapted to the most suitable teeth and imbedded in the wax plate. Up to this point there is no essential difference, whether for packing in the flask or on the model, only for the latter method the wax need not be trimmed up.

The wax plate carrying the teeth is now firmly fixed to the first model in its proper position; this is easily done by dropping melted wax on the posterior part of the palatal surface of model along the line where the plate terminates. The front part of the model, together with all the teeth and clasps, are now covered over with plaster, taking care to bring it slightly over the cutting edges of the artificial teeth. This forms a cap which will hold the whole firmly in position. When the plaster cap is quite hard the wax is removed, and the whole placed in front of a gas stove or fire to dry.

It may be as well to mention that the model can be made too dry, in which case the surface is readily rubbed off; at the same time, if not dry enough the chloro-rubber will not adhere to its surface.

The success of the whole method depends to a large extent upon having a good solution of chloro-rubber, which is easily obtained by dissolving whalebone or other rubber in chloroform. This should be made to the consistency of a thin paint.

When the model is dry, a thin coat of the solution is painted on all parts where rubber is to be packed, and left a few minutes until the chloroform has evaporated. After the solution is dry, the whole is ready for packing, and for this purpose suitable pieces of rubber are cut and warmed on a plate over hot water. It is better to fill up the interstices between the teeth first of all, and afterwards pack round the pins and fill retaining pits, that is, when diatoric teeth are used. Some little caution is necessary with regard to the amount of pressure used during the process of packing.

If too much force is applied it might be the means of breaking or misplacing the plaster cap, whereas the same force used in packing in a flask would be perfectly harmless.

However, if small pieces of warm rubber be used, and cut with some regard to the shape of the place they are intended to fill, the cap will be found to be quite strong enough for all practical

purposes. When all irregularities are filled in, a pattern should be cut to the size of the plate required, from which a uniform thickness of rubber is cut and adapted to the model in its proper position, care being taken to touch the deepest part of the model first, the object of this being to prevent inclosing air between the two surfaces.

It is impossible to overestimate the importance of packing just sufficient rubber, that no filing or reducing is necessary when the piece is vulcanized. Cutting or smoothing any part of the rubber is readily done by means of a hot instrument.

The last thing to do before investing in the flask is to cover all the outer surface of the piece with suitable tin foil; by this, a finished surface is obtained when vulcanized.

Edentulous cases differ only with regard to packing the front or gum part, before inclosing the teeth with a plaster cap, so that when one has become accustomed to manipulate the rubber on palatal surfaces, the front part presents little or no difficulty.

After the teeth have been set up and adjusted to the bite, the wax front is cut away with a warm wax-knife. The teeth are then cleaned and fixed on the model, which has previously been dried and painted in front.

In packing the gum it is advisable to stretch one thickness of rubber from one side to the other, that is all round the gum, superficial to this one thickness of pink is generally quite sufficient.

If, however, some contouring is necessary, the bulk of it should be done with the plate rubber, for the simple reason that it is lighter and stronger than pink.

After the teeth and gum of an edentulous piece are enclosed in a plaster cap, the method of packing is in every respect the same as for partial plates. Both sides having been packed as by the method described, the whole is inserted in the flask and vulcanized.

When gold or other strengtheners are used it is only necessary to slightly heat the metal and sink it into the rubber, and with a hot instrument trim off the edges.

By this means one can depend upon having the metal strengthener on the surface when vulcanized, as no movement takes place during the latter process.

ARTICULATION OF TEETH, WITH SPECIAL REFERENCE TO THE BONWILL METHOD.

DR. O. C. AUBREY, ALBANY, OREGON.

Pacific Coast Dentist, January.

Involved in Dr. Bonwill's method of articulation are several principles which, being understood, make a foundation upon which to elucidate a method.

First.—Dr. Bonwill has, by close observation and many measurements, established as a fact that in the average face lines drawn from one condyloid process to the other, from each of these to the cutting edge of the lower central incisors, from an equilateral triangle, the length of either side of which is four inches, never varying more than half an inch; showing that when the lower jaw

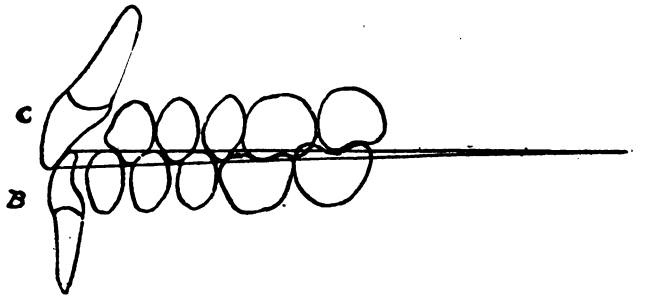


FIG. 1.

swings to either side from the condyle of that side, it moves in a segment of a perfect circle, thus allowing the bicuspids and molars of the opposite side to be brought into action for mastication without bringing into use the incisors.

Second.—Another law laid down by the writer as being one of the Creator's is, that from the cuspids back the bicuspids and molars run in almost a straight line instead of the horseshoe shape generally seen.

Third.—That, commencing with the first molar, and especially with the second, there is a decided curvature upward, corresponding to the amount of overbite in the incisors, the object of which will be explained further on.

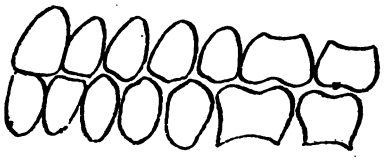
Dr. Bonwill, in order to put into practice what he had worked

out theoretically, had constructed what he is pleased to have called an "anatomical articulator," based upon principles partly set forth herein.

He says: Another law which has been overlooked is that of the relation of the upper to the lower incisors, wherein one has an overjet and the other a corresponding underbite. And that when this law is overlooked and not complied with in the arrangement of the bicuspids and molars, the incisors lose largely their function, that of incising food.

And further, that according to the length of this over- and underbite will be the length of the cusps on bicuspids and molars. Take, for example, the diagram Fig 1: In this a line drawn from A, representing one of the condyles, to B, cutting edge of upper incisors, shows what the length of overbite is. Now cusps of up-

Fig. 2



pers must be of great enough length to come to this same line A to B, and those of the lower to the line A to C, otherwise should the incisors come in contact during mastication, or in incising, bicuspids and molars would be thrown apart, as in Fig. 2, thus removing all support to the plate posteriorly.

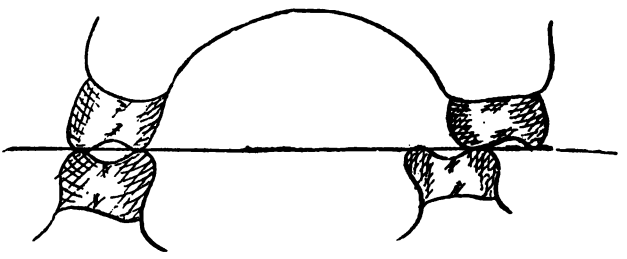
From Fig. 1 it would be seen that according to the length of overbite will be the length of cusps of bicuspids, and as we proceed towards the molars the cusps will be shorter; and if we were to set teeth as far back as A, Fig. 1, they would need no cusps at all. Nor would we want cusps on any of the teeth if we had no overbite, because they would be of no use, the incisors striking squarely together would not let them come into play; so that, the length of overbite having been determined, the length of cusps is seen at once.

The amount of overbite also determines the amount of upward curvature of molars; for, when the incisors are brought into action,

as in incising, the second molars should strike as in Fig. 5, balancing the plates. Should they not have this upward curvature, the result would be as in Fig. 2; pressure being all exerted anteriorly, with no support posteriorly, plate would tip.

In setting up a set of teeth after Dr. Bonwill's method, you first determine the amount of overbite, which Dr. Bonwill says is restricted to width of jaws and length of centrals. Knowing how much the underbite is to be, you can at once see how much to grind out the bicuspids, and the molars some less. Grind in the upper a groove between outer and inner cusps, shortening and rounding inner, having outer longer and more nearly sharp. Grind the lower just reverse; outer, round and short; inner, long and more nearly sharp. Never grind inner cusps of lower bicuspids and molars, for as now made they are universally too short.

Fig. 3

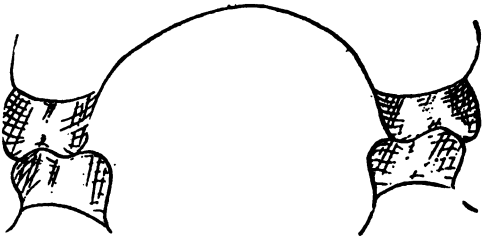


Make groove in upper nearer buccal than lingual side of tooth, and in the lower just the reverse. All grooves having been ground in upper and lower bicuspids and molars, and upper teeth being waxed in place, try on one of the lower bicuspids, the outer cusp of which should rest between the grooves of the upper, as in Fig. 4. Now try the lateral motion, drawing lower jaw to you, or pushing upper from you. Both cusps of each tooth should be in constant contact until they reach that point where outer and inner cusp of upper rests on outer and inner cusp of lower. Should they not thus meet, tilt either tooth out or in until they do, as in Fig. 3. Grind and set second bicuspid in same way; then the first molar, and finally the second molar, with this additional feature. Raise or tip forward posterior cusp of second molar, or, better still, tip first molar just a trifle, and second molar a trifle more, so that when the

lower jaw is pushed forward, as in incising, the upper anterior cusp of second molar will rest on posterior cusp of second lower molar, as in Fig. 5.

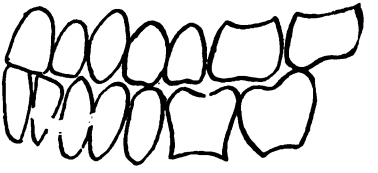
As you try the lateral motion, all the teeth on one side being in situ, should they not all occlude outer and inner cusps of upper on outer and inner of lower, as in Fig. 3, your remedy is to shorten some of the cusps.

Fig. 4.



When in the position of rest or inaction they should assume the position as represented in Fig. 4, all the inner cusps of upper resting in groove of lower. Should they not, your remedy is to either shorten the cusps of those teeth which hold others away from their antagonist, or deepen the grooves that these cusps rest in. This one side having been completed, set up the other in just the same way, inner cusps of upper in groove of lower.

Fig. 5.



When trying the lateral motion on this side, the left, the outer and inner cusp of upper should glide to that position where they rest on outer and inner cusp of lower (Fig. 3). And should they not all come in contact at one time, your remedy is to shorten those

cusps which are longest, which may necessitate deepening some of the grooves again when the teeth come back to their normal position, as in Fig. 4, that they may all be in contact, cusp resting in bottom of groove. With this additional feature, when trying the lateral or masticating movement, the cusps of upper on left side should not only rest on outer and inner of lower, but on right side lingual cusp of upper should rest on buccal of lower; and if they do not, your remedy is to either shorten cusps on left side or lengthen those on right side. If they are too long, thereby separating those on left side, either shorten them or lengthen those on left side. Now the lateral motion from right side should give same result as from left, and if not you have recourse to same remedy, deepening grooves or shortening cusps until, whether you move lower jaw to left or right, cusps are in continuous contact--one side for mastication with both cusps, the other with one cusp to balance the plate. This having been perfected, try drawing the lower jaw forward, as in incising. Do the posterior molars come in contact at the same time the incisors touch tip to tip? If not, you must raise posterior lower molar until they do, thus balancing the plate posteriorly. The lower molar should not be raised so that its two cusps are parallel, but raise the posterior one most, thus tipping the tooth forward. The best and most artistic result is obtained by tipping the first molar slightly, and continue the same inclination in the second.

And not only this, but from the cuspids back the bicuspids and molars should run in almost a straight line, instead of the horseshoe shape generally seen; thus being not only over the ridge, but also in direct line with the application of force.

Let me assure you that if you once get the proper understanding of Dr. Bonwill's method, and put a few cases into practice, you will surely think it the ideal method of articulation. He does not understand Dr. Bonwill's method to be one by which the disadvantages of a misfitting plate can be remedied, for, in order to masticate at all, we must have a plate that fits approximately, but one by which the usefulness and comfort of a plate which fits can be greatly increased. The writer was three days sitting up his first case by this method.

RESHADING ARTIFICIAL TEETH.

Dental Cosmos, December.

Dr. C. J. Essig makes use of the furnace and tooth body to reshade artificial teeth for special cases. The enamel is ground from the teeth where the new shade is desired, and body of suitable shade is placed on and fused.

Dr. F. H. Lee says it can be well done by fusing mineral paints on the teeth, in a furnace.

RESHAPING ARTIFICIAL TEETH.

With a porcelain furnace teeth can be reshaped to fit special cases. Any of the ready-made crowns can be enlarged or reshaped by the addition of body.

TO REMOVE OLD RUBBER FROM TEETH.

DR. BERHARD, BATH, ENG.

Southern Dental Journal.

A simple and easy method of abstracting and cleaning the teeth from vulcanite rubber is, first put the teeth in dry plaster on an iron spoon, covering the teeth with it. Place the spoon with its contents in the fire and let it remain until the plaster becomes red-hot, then withdraw the spoon from the fire, leaving it to cool, which occurs almost immediately. Then remove them from the plaster, and the teeth will be found to be perfectly clear and uninjured, as when received from the manufactory. He has also used this method with vulcanite mounted cases of two and three teeth. No trace whatever of any rubber adhering to the teeth. The teeth also become firmer by being annealed.

MASKING WITH ARTIFICIAL TEETH.

DR. F. F. DREW, BALTIMORE.

Dental Cosmos, July.

In 1893 Miss A., aged eighteen, called to consult regarding a case of irregularity. It was one we all know as a case of "Jimber

Jaw," or excessive protrusion of the inferior maxilla. The disfigurement was so great that the young lady had become morbid on the subject, and at the earnest solicitation of her friends she, two years before, applied to a dentist to have the deformity corrected by the use of appliances. She was under treatment for two years, at a cost to her of eight hundred dollars, and the accompanying model will give some idea of the amount of improvement reached in that time (Fig. 1). She was naturally very much discouraged, and was not very sanguine that anything could be done for her relief. In giving a history of the case, she said that in childhood she met with an accident in which the inferior maxilla was fractured. A

FIG. 1.

surgeon was summoned, who reduced the fracture, but improperly, and this was followed by ankylosis, which produced a permanent disfigurement. It seemed impossible to successfully correct the deformity by ordinary methods, and with the experience of the other dentist he concluded not to try. He did not wish to extract the upper front teeth, realizing that after absorption her appearance would be still worse, and decided to adopt the following method.

An impression, in plaster of paris, of the upper jaw was made. A model was obtained from this, and from the model a die and counter die in metal. A platinum plate, 27 gauge, was then swaged to cover the space on the die representing the surface from cuspid to cuspid, running it up as high as the frænum, extending over the laterals and centrals, and lapping over their cutting-edges, the part lapping over being punched with holes and roughened.

The plate was then placed upon the model, and four plain plate incisors of the right size and color were arranged to articulate

correctly with the lower natural teeth and soldered to the platinum plate. This was then transferred to the plaster model and wax extensions made back to the second bicuspids, gold clasps being fitted to the first bicuspids. The whole appliance was then flasked and vulcanized, the surface of the rubber being covered with pink rubber, was afraid it might show when she laughed, and the pink would be more in color-harmony with the mucous membrane. After finishing the rubber part of the fixture, everything was completed but the addition of gum in front. For this purpose the surface of the platinum around the teeth was barbed, and pressed celluloid around them, the surface being stippled to imitate mucous mem-

FIG. 2.

brane. The appliance was then transferred to the mouth and telescoped accurately over the four natural incisors, completely masking them, the celluloid blending nicely with the natural gum. The front teeth articulated correctly with the lower, and enabled the young lady to prehend properly, something she found it impossible to do before.

The improvement in her appearance was correspondingly very great, and she was naturally elated at the change which had been accomplished without any pain to her—quite a contrast to what she had gone through with two years before. She was of course directed to remove the plate frequently, so that the natural teeth could be thoroughly cleaned in order to prevent decay.

The accompanying model (Fig. 2) will give some idea of how the mouth looked when the mask was worn.

The ankylosis he did not overcome, but found just room enough to take the impression.

VULCANIZING FINISHED SURFACES.

Dr. N. R. Macalaster says that in vulcanizing rubber between metal to produce a smooth surface, the metal can be more easily removed from the plate and a polished surface left if quicksilver be rubbed on the surface of the metal before packing the rubber.

VULCANIZING ON METAL.

Western Dental Journal, July.

It is generally known that it is not possible to vulcanize rubber next silver, as the vulcanite will not harden on account of the affinity which that metal has for the sulphur which is in the rubber. This is likewise the case with iron and steel from the same cause, and it is necessary, when it is desired to vulcanize in juxtaposition to these metals, to interpose a coating of tin or gold. For the information of those who may not know, we will say that this is not the case with German silver, brass, tin, platinum, gold, or aluminum, sulphur having no affinity for these metals, vulcanite hardening thoroughly when next any of them.

TO PREVENT LOOSE TEETH IN VULCANITE WORK.

DR. C. BOXTON, SAN FRANCISCO.

Pacific Coast Dentist, May.

When making plates where the teeth are scattered, we often find one or more porcelain teeth quite loose, owing to the contraction of the vulcanite. To prevent this, bend the pinheads from each other, forming a wedge. To prevent pinheads showing through finished plate, bend them down towards face of model.

[It might be added, to clean the pins thoroughly of wax before packing.—ED. COMPENDIUM.]

CROWN AND BRIDGE WORK.

COMBINATION PLATE AND BRIDGE WORK.

DR. A. S. CONDIT, FINDLAY, O.

Dental Review.

It is not my purpose in this article to review the various methods that have previously been used in the insertion of partial sets of artificial teeth, but it is apparent to every dentist that all former methods have been attended with serious objections, but so much has been said about the abuse as well as the use of both plate and bridge-work that it is unnecessary to mention them in this article, so I will mention but two of the objections to bridge work.

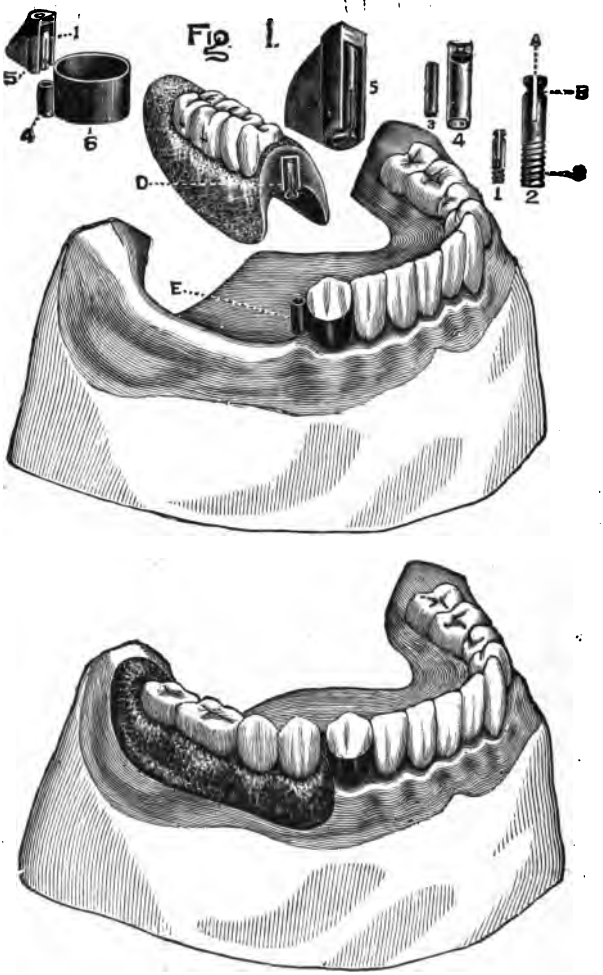
The rigidity of fixed bridge work is so unlike that of natural elasticity which is characteristic of all the natural organs, and especially the teeth.

Artificial substitutes should as nearly approximate nature in the restoration of lost tissue in the bones and teeth as not to be noticeable of any change to the tongue or surrounding parts, a fact which is completely ignored in the so-called self-cleansing bridge-work, which not only affords a receptacle for debris, but is also a source of irritation to the tongue and often affects the speech.

In Fig. 1 is represented the attachment both in its original and magnified size. The tube 4, in the magnified drawing, is cut away at the top to show the inner flange; the tube is the part of the attachment which is fastened to the crown or band, the flange being on the lower end for a lower case and on the upper end for an upper; through the flange passes a split pin 2, the split being compressed as it passes through the flange until it reaches the groove in pin, when by the spreading out of pin it is locked firmly in place and cannot be detached except by a straight up or down pull.

A very important feature of the lock pin is that of its being held in place by a screw; for after it is fitted to the tube it can then be removed and no further use is made of it until the work is completed. In 5 is shown the shield cap and ear; the shield part is

also a tube just large enough to slip over the one fitted to the band or crown and encircle it except at the side which is soldered ; the cap covers the end of the large tube or shield and has a thread hole



In Fig. 1 of the above illustration is represented the device in sections, viz:

1 represents the exact size of split pin.

2, the same magnified, of which A represents the split.

B, the annular groove, and C the screw.

3, the exact size of tube or socket.

4, a magnified view of same.

5, shows the different parts of device put together.

6, illustrates a band with tube 4 attached.

D, represents the device placed in the work and E the tube or band ready for adjustment.

through the center into which is screwed the lock pin. The ear, which is used for rubber work only, is for the purpose of holding it to the plate.

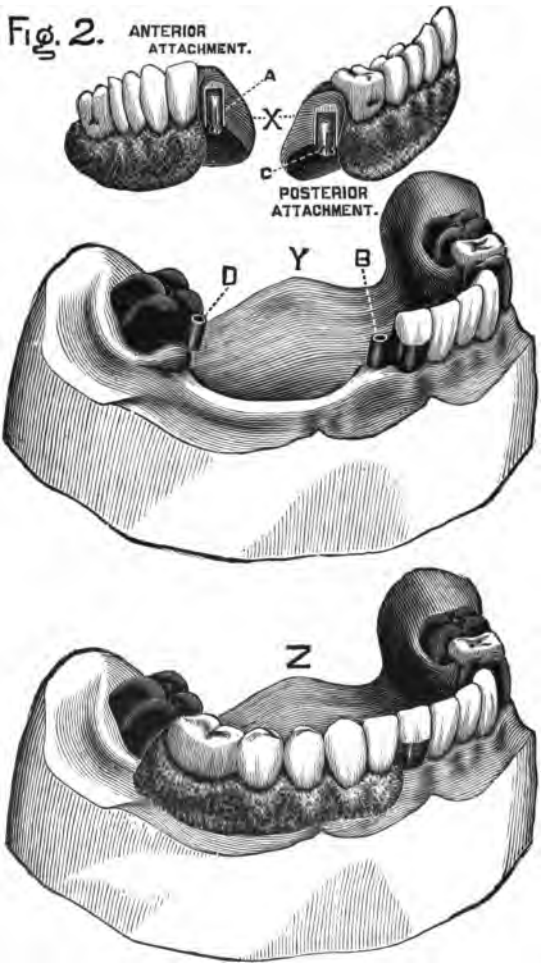
In Fig. 1 is also found a case where all the teeth, posterior to the cuspid, on the right side of the lower jaw are lost, a case in which bridge work cannot be used, neither could the work be retained by clasp on account of the sloping sides of the cuspid. The only other way known is to couple the teeth on both sides with a plate, which method forces all the pressure of mastication to come on the gums and alveolar process causing continued absorption and the usual tilting of one side while biting upon the opposite. In constructing a case by the new method a band or crown is made for the tooth adjacent to the space to be filled (if a tin attachment case is to be constructed either bands or crowns or one of each, can be used, as the judgment of the operator may direct); the gold tube is then soldered to the band or crown on the side next to the space on a line parallel to the lingual or palatal side of the tooth; the shield cap and pin are then fitted to the tube; if the tube be too long so as to interfere with articulation of teeth in opposite jaw, it can be shortened to suit the case. The band or crown, or both, are then placed upon the teeth, with attachments in place, and the cast is taken and the work of fitting teeth and making plate is done in the usual way.

Fig. 2 represents a case attached to central incisor and second molar on the right side of lower jaw. This is a case for which bridge work could be made, but in the judgment of the writer it would not be practicable.

There is much discussion just at this time as to the practicability of such cases, some claiming that the strain which would be brought to bear upon the incisor in mastication would be sufficient to move it from its natural position. This would result on account of its short, cone-shaped root, and the tooth would soon lose its efficiency in mastication. Others claim that the lateral strain would be broken up and distributed instead of being concentrated upon one side or the other. Most certainly fixed work has an important place for artificial dentures, but the operator must use most excellent judgment if he does not bring the work into disrepute by misuse. How often do we find almost, if not quite, perfect operations in certain favorable conditions which, if used under other conditions, would be complete failures; hence, many good things that

are of great value in many operations are not appreciated, and are possibly abandoned by many good workmen before their real value is determined.

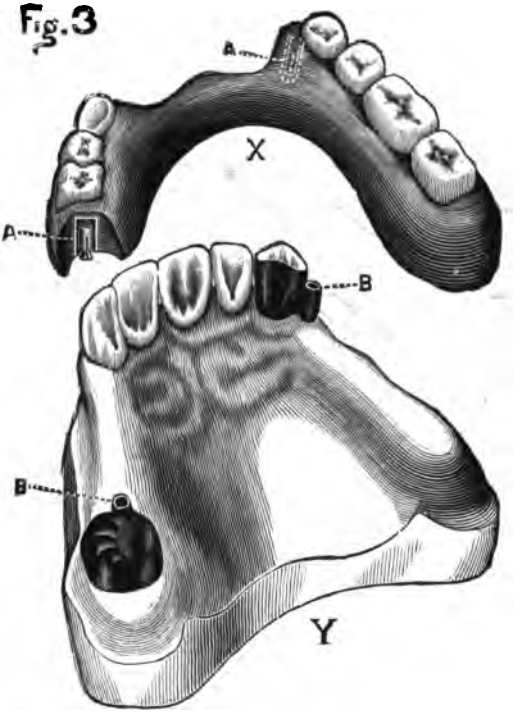
Is it not reasonable to expect greater permanence to the abutments of a partial piece of work if the gums are allowed to take a part of the strain in mastication than if the natural teeth are allowed



In Figs. 2, 3 and 4 of the illustrations, X represents the work ready for adjustment. Y casts of the mouth with bands and crowns in position and tubes in proper place for the insertion of the work. Z the work in position on the cast. A represents the device as placed in the work.

B the tube placed on band, C the split pin in position in the device, and D the tube as placed on crown.

to take it all? I have in mind a case, which is not illustrated, that must certainly convey to the mind of the close observer the advantages of this method over any other. It is in the case of the ab-



Showing mode of attachment.

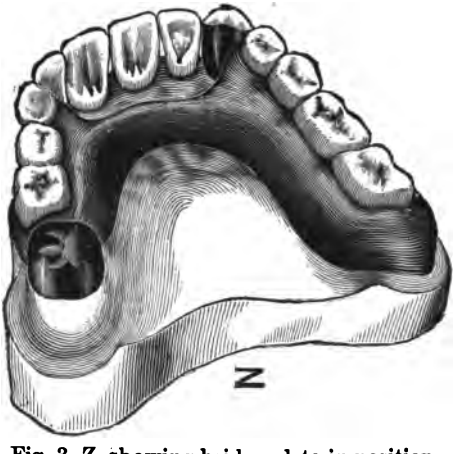


Fig. 3, Z, showing bridge plate in position.

sence of the lower incisors where the cuspids lean toward the space, as they usually do; every dentist has realized the difficulties incurred in such substitutes where there has been much absorption and plate work is used allowing all the pressure in cutting to be

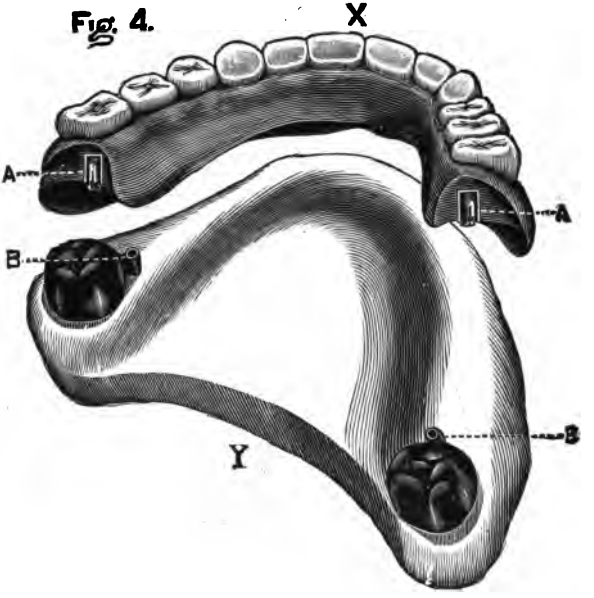


Fig. 4.

Showing mode of attachment.

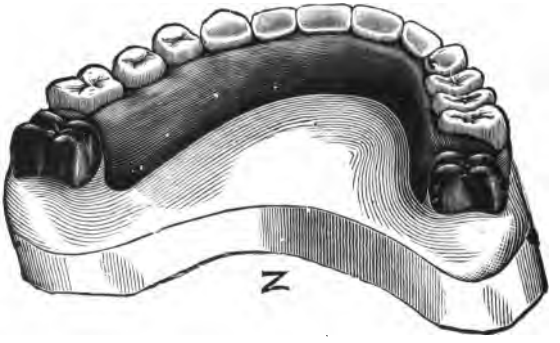


Fig. 4, Z, showing plate in position.

placed upon the gums. The absorption is rapidly increased, and very soon it is made unfit for use and very unsightly in appearance. By the adoption or the combination plate and bridge work method for such a case, the undue pressure is released and the work continues to retain its usefulness and appearance. A bridge for such

a case is no less objectionable, but the trouble is of a different character, as the cuspids, as before stated, are invariably inclined toward the space, making it almost, if not quite, impossible to insert a bridge; while with the new method, if the tubes are placed both horizontal and perpendicular upon the bands, the work can be as easily adjusted and removed for cleansing as can a plate. The most serious objection to a bridge for such a case is the impossibility of perfect cleansing, especially if the teeth are set close to the gums; and if not so set, the short edge of the teeth are a constant annoyance to the patient because of the irritation to the lips. Such a ridge cannot be too severely criticised on account of the accumulation of tartar; that is, if the patient is troubled, as they usually are in such cases, in keeping the natural teeth free from such incrustations, and it is most important to have a removable substitute.

In Fig. 3 is represented a case in the upper jaw with molars and bicuspids gone on the left side, the cuspid and bicuspid gone on the right; in this case we avoid covering the entire palate, and to make the work more secure than by atmospheric pressure, we attach to cuspid on left side and molar on right. This case will serve to illustrate one of the many combinations that can be made for upper cases. It is in such cases as this that great care and judgment must be exercised in making the work.

Fig. 4 represents the method of attachment where none but the molars remain in the upper jaw. In this, as in all other methods of work, good judgment is necessary in order that the best success may be attained.

BRIDGED LOWER INCISOR.

DR. L. L. HOWELL, RIVERSIDE, L. I.

Dental Cosmos, March.

The writer describes the operation of replacing a lower incisor, which is called "tipping," as follows: The right central incisor, inferior, was missing. He ground the incisors each side of the missing one on the articulating surfaces, down about the thirty-second of an inch, drilling two pits three-sixteenths of an inch

down each side of the pulp, but not coming in contact with it, placed a piece of twenty-four-carat gold on the surface of the teeth or tooth, ground and drilled, burnished the gold plate to fit the top of the tooth, then plunged a round piece of iridio-platinum wire (which would easily pass through a slot 21 gauge standard). On these caps was built up with eighteen-carat gold the space ground away. After building up, he placed them in position on the teeth, backed up a plain plate lower incisor, waxed it in position to the two tips, removed the three pieces, invested, soldered the dummy to the tips, then cemented the whole piece with oxyphosphate, making a complete bridge without destroying either pulp in the attaching teeth, and at the same time placing the whole strain in a direct line with the root of the tooth.

PRECAUTION IN SOLDERING BRIDGES.

Dental Register, July.

Dr. Geo. Evans says he always boils the borax out of gold crowns before soldering them on the outside. This is done to prevent melting the crowns.

TUBE TOOTH BRIDGE.

DR. J. H. SPALDING, PARIS.

Trans. Am. Dental Soc., Europe.

Take, for instance, a case commonly presenting: 1st. upper molar very badly decayed and requiring a crown; second bicuspid gone; first bicuspid root only remaining.

This represents a simple bridge of one tooth which can be extended as circumstances demand. After suitable preparation of the roots, make cap and pin for molar and bicuspid in the usual way, place these on the roots, take impression, and make model. Next select tube molar and two tube bicuspids. Those which are to be attached to the caps and pins already prepared are ground to fit the cap, but concaved on the side presenting towards the space to be filled. Over the end of each tooth so ground burnish thin pure

gold plate, pierce a hole and push through plate and tube the platinum wire, size to fill the tube. Remove tooth and fix with 22 K solder. Replace tooth in position, and burnish gold more carefully and trim off excess. For convenience in description we will call this the base. The tooth with its base is now placed in position on cap and held with wax, the tooth slipped off and the base and cap, united by the wax, are invested for soldering. Boil out wax and solder with 20 K solder. The tooth which forms the bridge—i. e., fills the space between these two crowns of attachment—is ground so as to leave the very necessary self-cleansing space, thus, the base made in the same manner as above described. Now fill the concavity in this base with 20 K solder. Next slip the teeth into place and adjust the bridge as desired and wax all together. When this is done, lift the bridge off the model, slip off the teeth and invest for final soldering. Please observe that at no time is the tooth or teeth kept in place while soldering, which is a great advantage. Much less gold and solder are used than in the ordinary method, which is an economy of great importance, and almost none is presented to view when the bridge is in place.

The next step after polishing the gold part of the bridge is to attach the teeth, which can be done either with cement or with sulphur. In the latter case the bridge and teeth are warmed and melted sulphur placed around the pin and base which receives the tooth. After a little practice this is very easy.

If at any subsequent time a tooth breaks, you have only to select another, grind it to fit, and fix it with cement.

BRIDGE WITH TUBE TEETH.

DR. J. R. CALLAHAN, CINCINNATI.

Ohio Dental Journal, July.

It is my desire to call attention to at least a partial correction of some of the defects in bridge work as constructed in this country. The points in favor of the use of English tube crowns in the construction of bridge work, are the concealment of metal, the introduction of crowns that are easiest to mount and least liable to fracture, that do not change their color during the course of

construction of the bridge and that are easiest to replace in case of accident.

We will give a few details for the construction of a simple piece of bridge work, extending from first superior molar to first superior bicuspid. The abutment teeth are ground to the shapes shown in Figs. 1 and 2, Fig. 2 being the approximal surface; gold caps are then made to fit these stumps. After caps are in place upon the roots, cut a hole through the cap just over the root canal for the pin to pass through, being careful to have opening of such dimensions that the pin wire made for these teeth will fit in the cap snugly. Having selected a suitable crown, fit it roughly to the cap; place the pin in the root and try on the crown; if it be much out of line with the other teeth the fault must be put right by bending the pin or reaming the canal in the direction necessary; try on the teeth

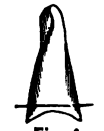
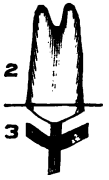
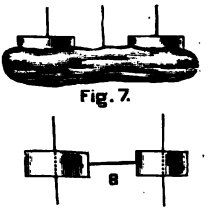


Fig. 1.





once more; when the proper position of the pin has been ascertained, remove the cap and pin from the mouth and solder the pin in its place.

Fig 3, showing pin and cap after being soldered. (Be careful to use smallest amount of solder and to get perfect attachments.) The caps should now be put in position and the crowns placed loosely on the pins; the crown to be suspended between molar and first bicuspid is now fitted to its place; the neck or that portion of crown coming in contact with gum should be ground to the shape shown in Fig. 4; a very thin platinum plate should now be soldered to a piece of pin wire of proper length; (see Fig. 5); pass the wire pin through the tube in the crown and burnish the platinum plate to the V-shaped portion of crown just referred to; (see Fig. 6); now dry the crowns and caps in the mouth, place a little sticky wax on

the second bicuspid crown and platinum plate and force all the pieces to place in the mouth. With a camel's-hair brush place a very thin film of oil over the porcelain crowns, then remove the whole bridge from the mouth by means of plaster in the impression tray, trim the plaster from about the metal parts, then cover the pins and caps with impression compound—allow the compound time to become thoroughly cool, then cut away the plaster and remove the crowns; the oil that was placed on the crowns will make this easy to do; this will leave the pins sticking from the modeling compound, as in Fig. 7; now place a mixture of plaster and marble dust over these pins, and after it is dry remove the modeling compound by means of dry heat; this will put the metal parts in position to be soldered together, and the porcelain crowns are out of the way, or, in other words, the piece will be soldered together without subjecting the porcelain to the heat that so often cracks and otherwise injures it. Place a piece of platina-iridium wire, extending from molar to first bicuspid, in the depressed platinum that was on the second bicuspid crown, flow enough solder over this to make a strong and smooth union, cool, remove and finish. The piece will then be as seen in Fig. 8. Place the metal on the roots in the mouth, adjust the crowns on the pins, and see that everything fits to its place; then finish grinding the occluding surfaces; then remove the whole piece from the mouth, roughen the pins slightly with a fine file, then boil all the parts in acid to remove every trace of oil or grease, dry with alcohol, then we are ready to attach the crowns to the bridge. Have a small vessel filled with melted sulphur; with pliers grasp the bridge by the metal pins, the crowns being in position, warm the bridge piece slightly in the flame of a Bunsen burner, then with a warm wire carry the melted sulphur to the pin in the grinding surface of crown; the sulphur will run into every crack and crevice in the neighborhood, and when cool the bridge will be ready to be cemented to the roots, and we will have a bridge piece that will show but a small line of gold at the gum border that has been easy to construct.

ARTICULATION FOR CROWNS.

"BUFF."

Dental Digest, March.

After the band is fitted and in place, mix a little plaster just thick enough not to run, take a little on the end of the mixing spatula and place in the mouth, covering the band and one or two adjoining teeth, then have the patient close the mouth and keep it so until the plaster sets. When set, have patient open the mouth, and if the plaster cannot be lifted off easily, just break in center and remove the two halves, then wax together, put band in place, and varnish and fill as any bite; but before filling bite, fill the band with wax, then when you separate the bite you will have no trouble in lifting the band from the model.

PORCELAIN AMALGAM CROWN.

DR. V. NUKI, HUNGARY.

Correspondenze Blatt.

This makes a very simple crown. Prepare the root same as for any crown, then take an impression and grind a plate or rubber tooth to fit. With pivot and tooth in position, pack a good amalgam around the pins and pivot and build up palatine part of the crown; when the amalgam is hard, polish it, and cement it into the root. These crowns can only be used for bicuspids.

PORCELAIN-FACED BICUSPID CROWN.

DR. A. W. M'CANDLESS, CHICAGO.

Dental Review, February.

The root having been properly prepared, a band is fitted thereto exactly as though an ordinary telescope or shell gold crown were to be made.

The buccal side of this ferrule is cut out with curved shears

at about where the porcelain facing is to be placed. Secure a perfect articulation in the usual manner, and then tack the cusp to the ferrule at a point the farthest from the porcelain; now, with the curved shears, cut away the gold of the cusp down to the point of the cusp, approximating the shape of the porcelain face at that end. Grind the facing, and trim the opening in the gold that is to receive it, until the fit is fairly accurate, but not absolutely so, however, as this is entirely unnecessary and requires too much time.

When the facing has been ground to the proper shape, remembering to always make it a trifle smaller than the space to allow for the thickness of the gold backing, bevel the edges of the porcelain all the way around, then when the gold backing is thoroughly fitted, which is only accomplished by thorough painstaking, annealing the gold often, and gently tapping to place with a small riveting hammer, place the tooth, backed with pure gold of 30 gauge, in position. Catch the gold backing to the ferrule and cast with sticky wax, slip the porcelain off, invest the gold in long fiber asbestus moistened with water, leaving only enough gold exposed so that with a small particle of solder the backing may be united to the ferrule; remove the investment, fill the joints where the solder is to flow with wax, fill the entire interior of the crown with a paste of plumbago or stove polish, so that the solder will not flow where you would not have it go, then complete the soldering of the joints and flow up sufficient solder to give the proper contour to the finished crown. At this point a lower grade of solder is used for filling the cusps. The porcelain-facing is slipped to place, the gold filed or ground to the proper shape and finished, and if the work has been properly done up to this point, a perfect joint between backing and tooth is the result. Remove the facing, then with a thin film of cement between the gold and the porcelain force the facing to place.

After the cement has set bend the pins of the tooth carefully outward from each other, and the facing is held with sufficient strength. In making these crowns 22 carat gold, 28 gauge, and 22 carat solder is used, with 14 carat solder in the cusps.

[This method appears in the 1894 COMPENDIUM, but this revision being more complete, it is used again.—ED. COMPENDIUM.]

BOWERS' CROWN.

DR. G. A. BOWERS, NASHUA, N. H.

Dental Cosmos, March.

In construction, 22 carat plate, 29 gauge, and 22 carat solder is used. A cameo die-plate is used instead of an intaglio. Selecting an approximate cusp from the die-plate, the thug is driven into it. A square piece of gold is then cut, annealed, and pressed into the cusps with the fingers, then driven down with the thug. It may be necessary to anneal three or four times to secure a perfect cusp. After trimming and facing, a strip of gold the length and width required is cut, shaped thus, , which is bent to approximate contour and faced with the file. The cusp is placed on the band, held with tweezers, and caught with solder. The band is then bent to the exact contour of cusp, and soldering completed. In using these crowns, select the one desired. Having the root prepared, push the crown on until it touches the gum, then take it off and trim; continue until it is in alignment with the other teeth. Let the patient bite, to secure perfect occlusion. Burnish the band, solder the seam, and fill the cusp with 20 carat solder. As these caps fit so perfectly, it is advisable to bore a small hole in the cusp to allow the excess of cement to escape. This can afterwards be filled with mat gold.

A CHEAP CROWN.

DR. R. E. SPARKS, KINGSTON, ONT.

Dominion Dental Journal, May.

Dr. Sparks uses, for cheapness, the old-fashioned wooden-pivot crown, with a pin of German silver, cemented in the crown first and then in the root.

FILLING CUSPS OF STAMPED CROWNS.

Dental Register, June.

Dr. G. H. Taylor, Alabama, swages the cusps by placing gold foil in the crown, which is left in and fused, to act as a filling for the cusps.

A DOWNIE CROWN REPLACED BY A BONWILL CROWN.

A Downie bicuspid crown broke away, leaving the pin so firmly implanted in the root that its removal was almost impossible. The pin was utilized by dressing it to fit a Bonwill crown. The crown was adapted to the root and set with cement on the pin.

CROWNING FRACTURED TEETH.

DR. GRANT MITCHELL, CANTON, O.

Ohio Dental Journal, February.

A boy in playing football had the left superior central and lateral incisors broken off near the gum. The central was a square break and presented no difficulties to a crowning operation. The lateral, however, was broken diagonally from the line of the gum, labially to a depth of quite a quarter of an inch on the palatal side.

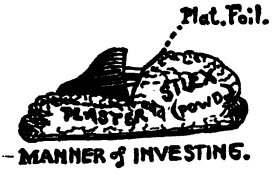


Fig. 2.

A Logan crown of suitable shade was selected and ground to fit the labial portion of the root. A piece of very thin platinum foil, annealed at white heat for several minutes, was pressed over the broken off crown (which, fortunately, had been saved) and trimmed to exact shape; this was then transferred to the root and carefully punctured for the insertion of the dowel post. A small piece of pink paraffin and wax was next worked between the thumb and fingers until it became softened by the warmth of the hand, then placed around pin of the crown, which was immediately inserted through the opening in the platinum into the root and firmly pressed into its correct position. After waiting a moment for the

wax to harden somewhat, the crown was carefully removed, together with the wax and foil, and invested in plaster and powdered silex (eq. pts.) in such a manner as to retain the exact relation between foil and crown after the wax was washed out with boiling water. The space, then, between foil and crown was filled, little by little, with Downie's porcelain enamel and baked, requiring three bakings. The result is shown in Fig. 2.

GOLD CROWNS MADE EASILY REMOVABLE.

DR. GORDON WHITE, NASHVILLE, TENN.

After the crown is finished, the contoured part is filled with gutta-percha, bringing the material to a feather edge at the orifice or neck of the crown, thus making the inner walls perfectly parallel.

The gutta-percha is applied by using chlora-percha, which is applied a coat at a time, drying the chloroform out of one coat and applying another. When the gutta-percha is hard, which occurs in a few minutes, try on the tooth to see if it goes on without obstruction. If so, remove, place in it enough cement, and set finally.

If, at any time, it should have to be removed, heat applied will soften the gutta-percha and allow its easy removal.

TO SOLDER CAP ON GOLD CROWN.

DR. J. G. TEMPLETON, PITTSBURG.

Dental Review, December.

To solder a cap on a gold tube intended for an artificial crown, lay the cap on about a tablespoonful of finely cut asbestus, put the tube in place on the cap, drop in the solder and a little powdered borax, then blow a yellow flame on the asbestus all around the tube until the solder flows, and there will be no danger of melting the gold.

STRENGTHENING HOLLOW GOLD CROWNS. FOR ABUTMENTS.

DR. F. B. KEEMER, MINNEAPOLIS, MINN.

Dental Review, September.

Troubles are caused by the failure of shell crowns used as anchorages to stand the stress brought to bear upon them. They will sometimes be torn or broken down where the bridge is soldered to them. Overcome that annoyance by doubling the band half way around on that side. After making the crown and fitting it to the tooth, or root, bend a strip of gold of a width equal to that of the band and reaching partly up over the occlusal surface, soldering it to the crown, thus securing two thicknesses of metal instead of one where strength is most needed.

A NEW METHOD FOR PREPARING A GOLD CROWN.

E. E. MILLS.

Dental Practitioner and Advertiser, April.

This crown is intended for bicuspids and molars in which one or more of the cusps of the tooth to be crowned are intact. It is especially adapted for forming abutments for bridges, when it is not desired to sacrifice much of the tooth tissue.

The preparation of the tooth is practically the same as for any other crown, except that the whole of the top is not ground off to make a flat surface. The sides are ground enough to enable the operator to fit a wide band upon it, and enough of the occluding surface to allow space for a plate of gold of about 24 standard gauge. But to gain this space the cusps of the tooth are not ground off flat, but are reduced just as much in the sulci as upon the summits of the cusps, thus preserving the exact contour of the grinding surface, the tooth being reduced the same amount in length at all points.

To do this, the fissures are first cut out with a bur, after which the remaining coronal surfaces are ground off by the use of any stone that may be adapted to the work. The tooth is thus reduced

as much as is required for the method, while the shape of the cusps is retained, and a considerable amount of tooth structure is saved.

After the tooth is thus prepared, the band is to be fitted. This is left as long as it is desired that the crown shall be when finished, instead of cutting it down to allow space for the swaged cusps. The next step is to contour the band at its articulating surface, that the natural appearance as to shape may be preserved. This is done by grinding or cutting the occluding edges down to the line of the prepared tooth itself, following the outline of the cusps and depressions, but leaving it to project above the tooth the thickness of the 24 gauge plate previously referred to, which space is subsequently to be filled with solder of a high grade.

The band being in position, the open occluding edge is stopped with a piece of softened modeling compound, which is pressed down upon the occluding surface of the tooth. After this has hardened, the band, with the modeling compound in position, is removed, and the whole is invested in sand and plaster, allowing the modeling compound to project. As soon as the investment has hardened sufficiently, the modeling compound is removed, leaving exposed a complete model of the coronal surface of the tooth.

A piece of thin platinum is now fitted inside the band, which covers the model of the crown of the tooth. Flux of a creamy consistency is then used, and by means of the blow-pipe fine solder is flowed all over this to the thickness necessary, which will be indicated by the projection of the band above the platinum. For the sake of economy this filling in of the top may be made almost entirely of scrap gold, merely using enough solder to unite the pieces into a solid mass. After the crown is thus filled, it may be at once put into cold water and cooled, when it should be again heated to a red heat and dropped into alcohol, which will leave a clean surface that will not be objectionable to the patient when it is tried in the mouth.

It should now be put in position, when, by the use of articulating paper and the proper stones mounted for the engine, it may readily be made to articulate perfectly, without cutting down the cusps of the occluding tooth, while it will have the exact length of the natural tooth, thereby avoiding the unsightly appearance of a crown that is either too short or too long.

All that now remains is to remove the crown, polish it up properly, and reset it with cement, or in any other method desired. There will now be a crown with no line of solder around the band. Sometimes this becomes tarnished when a swaged top is soldered to a shortened band, even though the solder may be of high grade. Aside from this advantage, the following points of superiority are claimed for the crown, in those cases to which it is adapted: First, saving of tooth structure. Second, saving of pain and annoyance to the patient, and labor for the operator. Third, economy of time and material. Fourth, more perfect articulation, with a better reproduction of the natural tooth.

ADAPTING LOGAN CROWNS.

DR. RODIGUES OTTOLENGUI, NEW YORK.

Dental Digest, March.

The root and crown are prepared as usual with the best skill of the operator. Then take pure gold plate, 34 gauge, and form a disk, having a hole in center for the passage of the pin. Fig. 1.

FIG. 1.

FIG. 2.

FIG. 3.

FIG. 4.

This disk is softened by passing through the flame, and placed over the crown, the pin passing through the hole. Next the crown is placed into position and the disk thus forced against the end of the root. Fig. 2.

This will approximately mark on the disk the circumferential

shape of the root end. The disk is now moved from the crown—the excess of metal trimmed away—and it is tried on the root from time to time (not on the crown), until the circumferential shape of the disk and root end are identical. The disk may now have a shape like Fig. 3, especially if we are dealing with a bicuspid. If it be placed again on the crown—and pressed against the porcelain—the relative circumferential shape of the disk and the crown would appear as in Fig. 4, from which it is manifest that if the crown had been set as first prepared, the overlapping porcelain—at a, a—would have extended beyond the edges of the root and have rested on the gum.

Gutta-percha is now placed in the hollow part of the crown around the pins, and the disk is warmed and pressed to place, the gutta-percha holding it there—while with small corundums in the engine the lateral excess of porcelain is ground away until the end of the crown coincides circumferentially with the disk—and consequently with the root end.

This accomplished, the crown is warmed until the gutta-percha is slightly softened, and it is then placed in the root and quickly driven home with a few smart raps of the mallet. The gutta-percha will be resistant enough to compel the soft gold dish to take impress from the root end, thus adapting itself accordingly. At the same time should there be a space anywhere the gutta-percha will be forced through at that point, and when removed it will indicate not only that the approximating surfaces are not yet coincident, but it will also point out exactly the connection needed to perfect the fit.

The disk and gutta-percha are removed to allow grinding with a corundum, and this process is renewed until the fit is as accurate on approximating surfaces as it was made circumferentially.

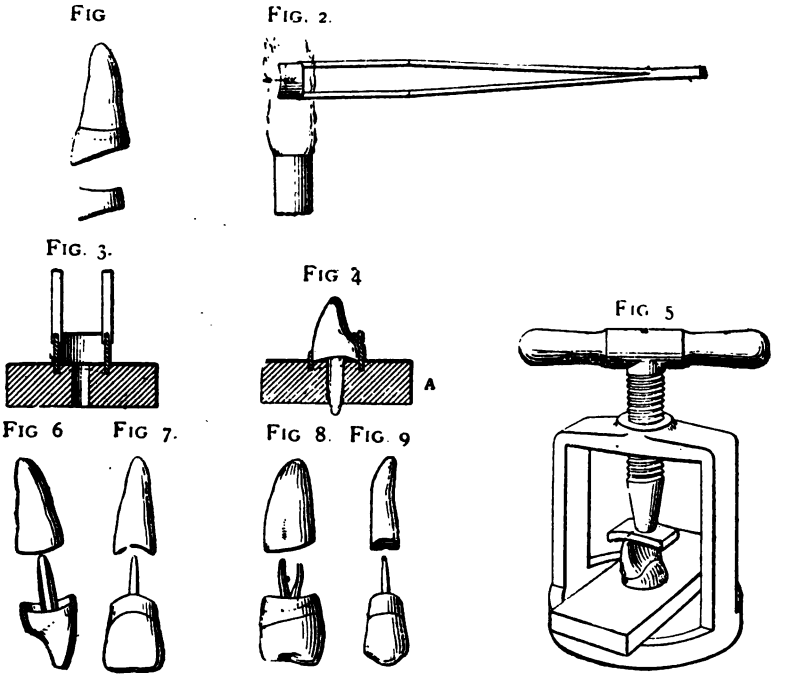
The disk finally takes an accurate impression of the end of the root touching it, and it and the gutta-percha are left in place when the crown is finally set. Thus we have a close joint, with a minimum of cement, and also accurate adaptation circumferentially. Set in this way, on healthy roots, Logan crowns are permanent fixtures—or as much so as anything in the mouth can be.

BANDING LOGAN CROWNS.

DR. T. P. HINMAN, ATLANTA, GA.

Dental Cosmos, March.

Prepare the root to be crowned as for any band crown. Make a band of twenty-two carat, 29-gauge gold plate to fit the root of the tooth. This band should be decidedly larger at one end than at the other, the small end fitting the root, and being wider on the lingual or palatal side (Fig. 1). Drive the band on the root, and mark on the inside all around the distance the root comes up into the band. Remove the band from the root, and burn into a block



of wood up to the mark where the root stops (Figs. 2 and 3). Drill a hole in the wood in the center of the band, so as to allow the crown pin to penetrate the wood (A, Fig. 4). Select a Logan crown, grind and align it in the mouth, remove the crown and force it into the band which remains in the wood, reducing the circumference of crown, if necessary, by grinding. Place in the improved Hollinsworth crown contour press, and force the crown into the band until

it strikes the wood (Fig. 5). Now with a heavy burnisher burnish the band to the palatal surface of the crown, clear over the palatal curvature (Fig. 5).

Remove the band and crown from the wood, and you will find they are fast together (Figs. 6 and 7). Trim the band to a feather edge with corundum stones, always grinding toward the cutting edge of the crown, and leaving the band wide on the approximal surface and narrow as desired on the labial surface. If these rules be followed, the band will be so tight on the crown as to make its removal a matter of difficulty. Figs. 8 and 9 are bicuspids done in the same way.

MOUNTING LOGAN CROWNS.

DR. E. R. STEVENSON, CORAOPOLIS, PA.

Dental Cosmos, February.

Prepare the root in the usual way, make a cap of gold to fit it, drill a hole over the root-canal somewhat larger than the enlarged canal, place the cap in position on the root and grind the crown to fit the cap perfectly; then remove the cap from the root, fasten the cap and crown together with a little wax-cement in as nearly their correct relation to each other as possible; then place them on the root while the wax is still soft, so that any necessary changes may be made; remove the two together and invest in plaster and sand; pack soft gold foil in the countersink around the pin until it is nearly flush with the cap, flow solder over this, and the crown is complete.

SETTING LOGAN CROWNS.

Dental Digest, April.

Dr. J. W. Huckler, Buffalo, N. Y., says, after the crown is well adjusted to the root, fold No. 4 gold foil into a pad of No. 80 thickness, punch a hole in it and slip over the pin, cut to a size a little larger than the neck of crown. Fill the cavity in crown with cement, slip the gold pad on, and set with cement in root. After the cement is hard burnish the edge of the pad into the joint, smooth and polish with strips.

PORCELAIN-FACED METAL CROWNS.

DR. J. BOND LITTIG, NEW YORK.

Dental Cosmos, March.

This method is similar to that of Dr. Evans, who uses a gold crown, and a lower fusing body and the blow pipe. Dr. Littig makes a platinum crown and depresses the face of it, into which he bakes porcelain body with the Downie furnace. After fusing the body, the platinum is fire-plated with Roman mat gold.

PORCELAIN-FACED CROWNS.

DR. D. M. GALLIE, CHICAGO.

Dental Review, January.

The writer says, all anterior crowns should have porcelain faces, and all bicuspids the same wherever practicable.

If necessary, only the buccal surface need be ground off sufficient to permit the facing to rest against it after soldered or attached to the band. The buccal or labial surface of all roots or teeth that are to be crowned with gold and porcelain should be ground slightly under the gum margin, so that when the band is adjusted the slight overhanging gum will reach the porcelain facing. This root or tooth should be slightly tapered from its neck toward the crown end. The measuring wire should be adjusted slightly below the fullest circumference of the neck, and the band then cut to this size. This will cause the band to be a tight fit, but a very slight tap will send it to place. Trimming the root and fitting the band in this way will allow the gum to grow around the crown without any inflamed or irritated appearance, because the gold used does not impinge upon or stretch the gums, for it is no greater in circumference than the original investment of enamel. If it is intended to adjust the ordinary Richmond crown, the facing should be ground so that when tipped at the cutting edge, the gold tip will be invisible. The same should be applied to bicuspid facings. This can be easily done by grinding the facing beveled at the cutting edge, backed up with pure gold, thirty-one gauge, well burnished over the bevel. If this is done the crown is greatly strengthened and not at the expense of artistic appearance.

TAGGART PORCELAIN-FACED CROWNS.

Dental Review, January.

Dr. Taggart uses the Diatoric tooth; he swages and burnishes a backing of pure gold to this tooth, which forms a V-shaped receptacle for the porcelain; through this backing, directly over large vertical hole in the tooth, he punctures a hole with a blunt instrument. By doing this a ragged margin of metal is forced part way down into the hole in the porcelain; into this hole he packs a mat of foil gold. After a drop of wax is placed on top the porcelain is removed; the backing and gold that has been packed into hole coming away together. This is invested and soldered into one mass. He then has a V-shaped receptacle and strong pin which fits over and into the porcelain, and when ready for adjustment are cemented together. The great advantage of this system is that no tipping of occluding surface of teeth is necessary, and the porcelain is not subjected to any heat whatever.

QUICKLY MADE CROWNS.

DR. F. T. VAN WOERT, BROOKLYN.

Items of Interest.

A Logan pin is first fitted to the root and the protruding end split, and the ends bent down close to the end of the root, forming a T-shaped pin; with the pin in the root an impression is taken, the pin withdrawn from the root and replaced in the impression, and a plaster model obtained with the pin in place; a plain rubber tooth is ground to fit, placed on the model and held with the fingers while fusible metal is poured or fused with a hot spatula on the palatine surface, and filling up the space between the pins and end of the root; while the metal is still soft, a piece of chamois is placed over it and quickly pressed with the thumb. The completed crown is removed from the plaster, surplus metal filed off and polished on the lathe, and it is ready for setting.

Dr. Van Woert does not put this forward as a permanent crown, but merely as a temporary affair, but the fit is so good and the attachment so strong it seems as durable as some more elaborate crowns.

DR. DEWITT BARNER'S METHOD.

In his practice some variation of details has been found advantageous. It will be observed that there is no union between the fusible metal and the pins; it merely flows around them as vulcanized rubber does. He uses a German silver pin with a piece of German silver plate soldered across the end like the head of a tack; the pins in both root and tooth are touched with a saturated solution of zinc in hydrochloric acid, and then when the fusible metal is poured it solders itself solidly to both. After the German silver pin is filed to fit the root, it is cut off one-quarter inch from the root. This extra length is a convenience in placing the pin in the impression, and can be cut off after the model is obtained.

CROWN WITH ACCESS TO PULP CHAMBER.

DR. W. C. LOGAN, ASTORIA, OR.

Pacific Coast Dentist, February.

The tooth reported was a right superior central with the crown gone, and a recurring abscess. The crown was made to strengthen the shell and still give access to the canal for treating the abscess if necessary.

This was done in the following manner: Removing all decay and making two tubes, one to fit the other, the larger was fitted to the canal, and combination filling put in around it and built up. This gave a solid foundation to work on. A ferrule was made and put in place, then with a spear-pointed drill a hole was made through the ferrule into the large tube already in place. The smaller tube was then placed into position with the end well up to the apex, the other end exposed about one-quarter of an inch, an impression taken, varnished, soaped, and poured with marble dust and plaster. A plate tooth previously selected was fitted and waxed into position with sufficient marble dust and plaster to cover face of same. After drying, the case was soldered, finished, and put into position, cotton was dipped in campho-phenique and carried into the tube to apex of the root, and the opening on the lingual surface was sealed with gutta-percha.

RATIONAL METHODS OF CONSTRUCTING CROWNS AND BRIDGES.

DR. HERBERT MILLER, PORTLAND, OREGON.

Pacific Coast Dentist, January.

So much has been written upon the construction of crowns and bridges within the past few years that the various details should be pretty well understood. He does not enter into the details of mechanical construction, but proceeds to describe what are believed to be more rational than the forms generally understood.

The question is not whether a tooth can be restored after the natural crown is too badly destroyed to fill, but how much of the root may be lost and still admit of preservation and restoration of appearance and usefulness, by means of an artificial crown. Success will depend, first, upon the judgment and discrimination of the operator, and, second, upon his ability to construct such a device as is best suited to preserve the remaining portion and restore the member. In all cases the end of the root, which is exposed to the fluids of the mouth, should be perfectly protected, and if possible a band or ferrule should encircle it to prevent splitting when subjected to force. The making of Richmond and all-metal crowns is so well understood that he does not consume time speaking of them, but proceeds to the construction of crowns, where naturalness in appearance, combined with strength and durability, is of great importance. If it is probable the root can be made of use in helping to support a bridge in the near future, the crown should be so constructed as to be easily removed without interfering with the sealed root. This may be done by making a cap for the root with a tube penetrating it, instead of a post. The root having been properly filled and capped in this way, any kind of a porcelain crown may be adjusted, provided it is attached by means of a screw (which may screw into the tube in the root) or a pin fastened to the crown and held in the tube by gutta-percha, which will enable the crown to be easily removed by the application of heat.

A beautiful piece of work may be made by fitting an English-tube tooth to the cap, and holding it in position by a screw passing through the crown into the root tube. A simple method of

construction is to back a porcelain veneer, allowing the metal to project back far enough at its base to cover the tube and have a good bearing where the screw passes through it. He generally uses a small quantity of Harvard cement, to secure a good joint between the cap and the crown, but no cement should enter the tube. For stationary crowns, English-tube teeth will be found very excellent. After preparing the root, make a cap for it; then grind the tooth to fit, and insert a pin through the tooth, cap, and into the root in one piece, if possible, which may be soldered to both cap and tube tooth. In case the tooth is not soldered to the pin, it can be cemented in place. In most cases he prefers to make the cap and pin of platinum, using pure gold for solder. Place a thin layer of porcelain body over the cap, press the tooth into place, put a small piece of gold over the top of pin and fuse the porcelain body. This will unite the porcelain tooth to both cap and pin. A little more porcelain may be baked over the end of pin and tube, to hide them, if desired. In case of some molars, it may be desirable to construct the cap without pins in the root. Cement it to place, drill small holes through the cap and into each root, through which to insert screws anchoring it securely; now cement the tube tooth in position, and the operation will be a grand success.

When the crown to be constructed is forward of the molars, a beautiful and durable piece of work is made by grinding the root off a little below the gum on the labial surface; next make a band of thin platinum, place it in position, slit and burnish the projecting portion over the end of the root, almost or quite making a cap. Select a suitable porcelain tooth; solder a platinum post to the pins and to the cap with pure gold; invest the under portion of the cap and around the pin with suitable investing material, allowing the tooth, top of cap and front of band to be exposed and project above. Now fill in and contour the crown to suitable shape with porcelain body and bake. Two or three bakings may be required to complete the work. In cases where there is a recession of the gum, artificial gum may be baked upon the band and front of the tooth to suit the conditions. Sometimes a patient has a front tooth badly mutilated, but containing a living pulp. In these cases a thin platinum cap with roughened surface and covered with porcelain will make an ideal crown; but care should be taken to grind down the natural tooth sufficiently to admit of a thick layer of porcelain,

and high-fusing body must be used for the first bakings, which can be ground to the desired shape and will retain its form during the final enameling.

Having thus described a class of removable and stationary crowns, and a bridge having been defined as an extension of crowns over a space, he proceeds to describe the construction of bridges, and confines his remarks to removable bridges, and by that term to mean a bridge which the patient may remove at will, but an artificial piece which any intelligent dentist can easily remove for repairs, extension, or polishing. The desirability of being able to remove extensive bridges without mutilation or inconvenience to the wearer must be conceded by all.

Take a case in practice: Subject wearing a plate; superior jaw with both bicuspids on left side, first bicuspid on right side, and four incisors missing. The cuspids and first molar on left side contained large fillings; the pulps in cuspids were devitalized, their tops cut off and sealed with caps which contain a tube with thread cut in, as before described. The right second bicuspid and left first molar were shortened sufficiently and made to taper slightly from their necks to the grinding surface. Smooth flat-top crowns were made of thin platinum and cemented in place. A second crown of suitable shape and strength was made to telescope over these first crowns, and constituted the ends of the bridge. The nine teeth between were fitted and backed with metal in the usual way, but without the gold being reflected over the cutting edges of the incisors and cuspids. The nine teeth, two end caps, and abutments to fit over the cuspid caps were soldered together and finished.

This bridge was placed by spreading a thin coat of gutta-percha over the inside of the end caps, and a layer of Harvard cement over the caps on the cuspid roots, the gutta-percha softened by heat, and the piece placed and pressed to its proper position, the screws inserted into the tubes in the cuspid roots and driven home. A bridge of this kind can be at any time removed by drawing the screws and softening the gutta-percha by heat.

Another case: Superior jaw; lateral incisors, bicuspids and first molars gone; the central incisors projected forward a great deal. Telescope crowns were made for the second molars and the inner crowns cemented to place; the pulps of front teeth were devital-

ized, their tops cut off and roots capped with tube caps, as before described.

In this last case the incisor roots were so far forward that to place the crowns over them would project the lip too much, as it had been before. To overcome this difficulty, a gold base upon which to mount the six front teeth was made with forward projections to fit the caps on the incisor and cuspid roots, and held by screws. The molar and bicuspid crowns were made with porcelain faces, their entire grinding surface for each side was swaged in one piece to fit the lower teeth, making a perfect articulation. For the incisors and cuspid, English-tube teeth were fitted to the gold base and made to approximate the gum in front as closely as possible. A pin for each tooth was soldered into the gold base, and the whole bridge united. This bridge was inserted by using gutta-percha in the end crowns, a small quantity of cement over the caps on the four front roots, and putting in the four screws. Having secured the bridge in its proper position, the six front teeth were set in their place with gutta-percha. Should it become necessary to remove the bridge, apply heat to the central incisors and cuspids, and detach them, which will uncover the screw-heads; withdraw the screws, warm the end caps, and the bridge will slip off.

Many of these pieces can be made more beautiful and natural in appearance by constructing the foundations and connections of platinum and filling in with porcelain body, baked as in continuous gum work, but in all cases the base should be strong enough to prevent bending or springing; otherwise the porcelain will be likely to crack and chip off.

SWAGING GOLD CROWN CUSPS.

DR. B. H. CATCHING, ATLANTA.

After the band is fitted and articulated, and while in position, fill the end full with modeling compound and let the patient bite on it. This gives the proper occlusion. Remove the band and trim the compound to the proper contour. Mix a small quantity of Teague's compound or plaster, pour it on a piece of tin; while it is soft press the bite into it up to the band. Immediately place

around it a ring made of tin, thin brass, or even pasteboard, one inch deep and three-fourths of an inch in diameter. When the plaster is hard enough, remove the ring and crown band, trim the surface of the plaster smooth, hold it over the flame to dry partially, place on the ring and pour with type metal. Cool the die in water and drive the cusp end into a block of lead. This makes, in fifteen minutes, dies for the swaging of cusps.

Fill the cusps with solder, file flat, set the band on in proper position, hold in the flame, and the solder filling the cusps will unite the cap to the band.

REMOVING ENAMEL FOR GOLD CROWNS.

Dental Review, October.

Dr. Weeks says it is not always necessary to remove all of the enamel to insure a perfect adaptation of band at the gingival margin. Teeth for gold shell crowns usually have cavities on one or both of their proximate surfaces. Under these conditions it is very easy to so shape these surfaces that the tooth when viewed buccally or lingually presents a truncated cone. In most bicuspids and molars there is the greatest overhang of enamel on the lingual surface. If, then, the buccal surface is so shaped that it converges toward the center of the tooth, the enamel on the lingual surface need be disturbed very little; it becomes apparent that an overhang of one surface will not preclude a perfect adaptation of the band at the gingival line.

If the bands are made of twenty-two carat gold alloyed with pure silver, they can be sufficiently shrunk with a burnisher to overcome a slight overhang of enamel. His observation has convinced him that only a small portion of the irritation and inflammation of the soft tissues about teeth bearing crowns is caused by bands which do not touch the tooth at every point of its circumference at the gingival margin. Such irritation comes from three causes. First, from the edge of the band being rough or improperly beveled. Second, from the band being forced so far beneath the free margin of the gum as to encroach upon the tissues at some point. Third, from lateral motion caused by the stress of mastication upon

a crown which does not occlude properly in every position taken in mastication.

A fourth cause of irritation is imperfect contour and contact of the proximate surfaces. He does not wish to be understood as disparaging the necessity for the most careful preparation of teeth and roots which are to carry crowns, but to emphasize the fact that there are several other points of equal importance if we would avoid failures.

BACKING TO PREVENT FRACTURE OF PORCELAIN FACINGS WHILE SOLDERING.

DR. F. R. SANDUSKY, NASHVILLE, TENN.

Dental Cosmos, October.

Taking any of the six anterior teeth, one or all for a single crown, or a bridge of from one to six teeth; with No. 28 or 30 gauge pure gold, back line the facing, letting the gold extend over, being burnished to the cutting-edge and dressed off even with the labial surface of the facing. In backing with this piece of gold the pins are left standing in their original position. Cut another backing of 22-carat 28 or 30 gauge gold exact size of first backing, letting this piece extend beyond the cutting-edge instead of being bent and burnished down. After bending the pins and securely burnishing the backs of the pieces of gold to the facings, file towards the approximal sides, dressing the backings to an exact contact with the sides of the facing; invest (cutting-edge uppermost) in thinly mixed sand and plaster to where the first backing touches the labial surface of the facing; flow 20-carat solder along the edge. After cooling, this solder-edge can be dressed and shaped to suit the case in charge. If the bite is a very close overlapping one, the facing may be ground from the pins towards the cutting-edge until the thickness desired is obtained; then proceed to back and tip as described. This thinning of the facing of course lessens the strength of the porcelain and renders it more liable to crack in soldering. Having thoroughly tested the merits of this process, the writer feels sure that where it is used, porcelain facings are much more secure. These edges may be filed to a thinness so that but little gold is exposed, yet durability obtained.

BACKING AND PROTECTING PORCELAIN FACINGS.

DR. H. J. GOSLER, CHICAGO.

Dental Review, June.

The facing should first be ground to perfectly fit the space, after which the lingual portion of the cutting-edge should be ground on a true bevel extending about one-half the distance to the pins, leaving the cutting-edge a sharp but smooth angle.

Use preferably 26 gauge pure gold and after punching holes for pins, burnish to fit tooth snugly, or this can be accomplished easily by placing tooth and backing on a piece of cork, and lightly swaging with a piece of soft pine and light hammer. Trim off surplus gold, remove backing and insert small pieces of graphite in holes, place on asbestus or charcoal block, and reinforce by flowing over back of gold a small amount of 20 or 22 K solder to insure retention of its form and shape, replace on facing, cut pins off close and split with a small sharp chisel, which rivets the backing to the facing and leaves no excess of pins to be subjected to heat of soldering before porcelain is sufficiently hot, thereby relieving the probable cause of the greater proportion of the checked facings in solderings; then with a fine file dress the backing down on the approximal surfaces, filing of course toward the porcelain that the gold may be held in place, and then in filing the backing on the cutting-edge the file should be passed on a parallel with the labial surface, which will leave the thickness of gold for a tipping, care of course being exercised to avoid leaving an overhanging edge, which will result in the fracture of the porcelain upon the contraction of the gold after soldering. If the thickness of the tipping of gold should be objectionable, it can then be dressed down until scarcely perceptible and yet afford ample protection to the porcelain, for, as can readily be seen, it will be impossible for the occluding teeth to come in contact with the facing in masticating.

The same procedure applies as well to bicuspid and molar dummies for bridge work, only that a thinner gauge gold may be used (28 or 29 gauge), as it is afterward filled in with gold scraps and solder, and after facing is ground and backed and a suitable cusp has been swaged, the buccal portion of the cusp should be cut away to

the occlusal angle and jointed as well as possible to the facing, then held in apposition with hard wax, invested, and soldered; the joint between cusp and backing will fill in nicely with solder, and after finishing will result in a beautiful piece of work, accomplished with the minimum amount of metal showing, with the preservation of the angles of the tooth, and with the perfect protection of the porcelain.

REPLACING PORCELAIN FACINGS IN CROWN AND BRIDGE WORK.

DR. W. S. TWILLEY, BALTIMORE.

Dental Cosmos, March.

The root is prepared and shaped in true contour with the alveolus. The band is shaped parallel with the alveolus, which brings the cap when in place close down to the root. After attaching the cap-piece and pin in the usual way, the porcelain is ground to fit and backed up with stout backing. Do not bend the pins, but hold in place with a little soft wax. The backing is secured to the cap with hard wax. Then by running a thin-bladed knife between the face and the backing, the face will slip out of position and leave the pin-holes open and exposed. Take black-lead points No. 4½, made by Henry Cohen, Philadelphia, cut in half, and insert a piece into each hole. Invest as in ordinary work, and solder. The solder will flow around the carbon or lead cores, which are easily removed with a fissure-drill. Make a countersink in the solder with a cone bur at each pin-hole, and set the tooth in position, using a little cement, if desired, to close any possible space. Invest in hard modeling compound, and with punch and hammer rivet the pins into the countersinks. Polish and set the piece.

If a face is broken while the crown or bridge is being worn, grind off the pins to the backing and drive out the remaining part. Fit in a new face, and set with cement. Hold a piece of lead or a lead mallet on the facing, and with the automatic mallet drive the pins down into the countersinks. This makes a head on the pins, and crown or bridge is as good as new. Replacing a facing should not consume more than twenty-five minutes.

REPAIRING FACINGS ON BRIDGE WORK.

DR. C. W. JENKINS, ZURICH, SWITZERLAND.

Dental Cosmos, February.

A simple method of restoring the porcelain facing broken away from a piece of bridge-work is as follows: Take, for illustration, a central incisor. Make a perpendicular slot in the backing of a width slightly exceeding the distance between the outer edges of the pins in the selected tooth. The depth must be proportioned to the thickness of the gold at this point, care being taken not to endanger the strength of the piece. Undercut on both sides. Fit accurately to this slot a beveled slide of hard 18-carat gold backing. It should be exactly flush, no more. After grinding the tooth to gum, adjust to the backing and try in. When all is satisfactory, solder. The holes for the pins should be widely reamed (not enlarged), and but little solder used. File away surplus, and you will have a tooth which will slide exactly into position, leaving the lingual surface of the piece unaltered. A little thin phosphate will secure it.

AID TO TAKING IMPRESSIONS FOR CROWN AND BRIDGE WORK.

DR. T. F. CHUPEIN, PHILADELPHIA.

Dental Office and Laboratory, May.

Every one who has taken impressions with plaster of paris for crown and bridge-work or indeed plaster of paris impressions for any partial cases, where some of the natural teeth remain, have observed how the plaster will adhere to the necks of the teeth and is broken away when the impression is withdrawn. Many suggestions have been advanced to overcome this, such as mixing the plaster very thin, drying the teeth and painting the necks with glycerine, oil, or soap solution before introducing the plaster in the tray, but, in his hands, without effect.

To overcome this difficulty, Dr. Chupein uses a piece of No. 30 gauge lead, one-sixteenth of an inch wide, about one and a half inches long. It is bent around the neck of the tooth, the ends

brought together with pliers; they are clipped off, leaving an end projecting which is to engage the plaster when the impression is taken. The lead band is burnished to fit the neck of the tooth accurately. When the impression is taken, it brings away the lead collar. He uses for pouring such impressions fusible metal, which melts below the boiling of water. After the metal cast is made and separated from the impression, the lead collar is removed from it.

MATRIX FOR INLAY.

Dr. Genese uses a piece of No. 4 gold folded once; it is pressed into the cavity with softened wax. The whole removed, invested the wax melted out, and porcelain fused in the cup.

PORCELAIN INLAY.

Select an artificial tooth of the shade desired, excavate the cavity to be filled to the proper shape, grind the tooth thin leaving the front untouched. With hot shellac fasten the facing to the end of a piece of hard wood—the enamel side to the wood. Coat the ground surface of the facing with colored wax, press it against the cavity; the wax will press in and define the shape. Grind to approximate the shape, wax and try again. A few trials will enable the piece to be fitted nicely. Set with thin cement. This relates to buccal and labial cavities. Jewelers use a wax for holding gold to be engraved that is very tough, and will answer better than the ordinary shellac for holding the inlay to the wood.

SETTING INLAY.

Dental Review, January.

Dr. Seymore suggests the use of sulphur. It melts at about 228°, but that degree of temperature is not necessary in setting inlays.

SUBSTITUTE FOR CARBON PAPER.

DR. B. F. ESHELMAN.

Dental Review, October.

The writer has found that to blacken the surface of a strip of writing paper with a lead pencil affords a ready and efficient substitute for carbon paper, when necessary to grind a crown or denture in the mouth. Drag the paper slightly when closing.

TO MAKE POSTS FOR BONWILL CROWNS.

DR. R. E. SPARKS, KINGSTON, ONT.

Dominion Dental Journal, May.

Draw some fine wrapping wire through a solution of chloride zinc, then through a spoonful of molten tin. Now fold it upon itself in lengths, as long and as often as length and size of case require. Molars will usually take about six strands, bicuspids four, depending upon size of wire. A slight twist will hold them together in the center. Unite them with a little soft solder or tin. This may be done with a soldering iron, or by placing a little solder or tin upon the twist and holding it over a gentle flame. Snip off the ends and you have a post to all parts of which amalgam will adhere, and having free ends to run into root canals at one end and the other passing through the crown. After the surplus has been cut off, amalgam packed, etc., the free ends may be crumpled into the cup on the end of the crown and covered with amalgam. They are quickly made, but it is economy of time to have a supply of various sizes and lengths on hand, and select one to suit the case.

GUIDE TO REAMING ROOT CANALS FOR CROWNS.

Dental Register, July.

Dr. George Evans says the apex of a tooth and the incisive edge are almost on a direct line. He uses this to advantage, in reaming root canals, by calculating where the incisive edge of the missing crown was. The remaining adjoining teeth will aid in the direction, by keeping the reamer in a line with that and the apex.

CROWNING BADLY DECAYED ROOTS.

DR. G. H. CHANCE, PORTLAND, OR.

International Dental Journal, September.

The case presented the following conditions: Crown entirely gone, decay extending above and beyond the ordinary gingival margin when in a normal condition, gum badly inflamed and entirely covering up the root. The first step in the operation was the removal of the excess of gum-tissue, and, ascertaining that the root still possessed sufficient strength to support a crown, the decay was removed, and the concave depression in the end of the root made smooth with round-ended engine burs, the pulp-canals in the root opened and treated in the usual manner, and the space between the entrance to the canals and the gum margins closed with cotton and sandarach varnish. The patient was then dismissed for the time being.

At the next sitting the pulp-canals were filled, and an impression of the parts was taken in modeling compound, from which a plaster cast was made, and from it dies of Mellott's metal, for the purpose of striking up a thin gold cap to fit the concavity in the end of the root, using enough gold to allow the edges of the cap to extend to the gum margin. When the cap was ready it was adjusted to the root, and, with cap in position, a second impression with the bite was obtained, the cap coming away with the impression, which was transferred to the plaster cast. A Bonwill crown of the proper form and shade was then selected, ground, and the upper margins beveled so that they would just enter and be inclosed by the edges of the gold cap, giving it somewhat the appearance of a banded Richmond crown. The next step was to insert a small screw-post of the proper length in each pulp-canal, which being done, a slot was cut in the top of the cap, large enough to allow the ends of the post to pass through. The parts were then dried, and the convex surface of the cap painted with a little thick chloro-percha and slipped over the posts to its position on the root, gentle pressure being used to force out the excess of chloro-percha, while a warm blast was thrown on to evaporate the chloroform. The crown was then cemented to its place with oxy-

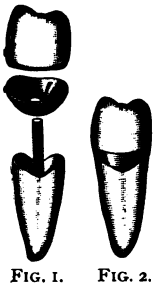


FIG. 1. FIG. 2.

phosphate, and the occluding end in the cavity of the crown capped with gold, the whole forming a firm and, to both operator and patient, a very satisfactory piece of work, which, after several months' use, is still doing good service.

Figs. 1 and 2 show the operation.

TIPPING TEETH WITH PORCELAIN.

DR. J. Y. CRAWFORD, NASHVILLE, TENN.

Ohio Dental Journal, September.

Broken incisors are restored with tips ground from porcelain teeth, preferably of English make, because of superior density of body and susceptibility to polish after being ground. The portion selected to form the tip is so ground as to admit of inserting the pins of the porcelain tooth in holes drilled in the dentine or in the gold of approximal fillings of the broken tooth. In the case operated on, the central incisor having approximal fillings, gold and tooth were cut off squarely and a lower lateral incisor adjusted transversely and so inverted as to allow the pins of the tooth to enter the tooth perpendicularly.

CROWNS AND JACKETS FOR TEMPORARY TEETH.

DR. LOUIS OTTOFY, CHICAGO.

Ohio Dental Journal, October.

In speaking on this subject, Dr. Ottofy says: In the case of molars, this practice offers many advantages. Usually it is best to take an impression in wax, modeling compound, or Mellott's clay, then with the Mellott outfit dies and counter-dies are quickly made and a cap struck up. Frequently there is no necessity of shaping the crown, as usually it is unnecessary to extend the cap down on the crown, except for a short distance. It is sufficient if it extends far enough so as to hold it in place. Its purpose is merely to serve as a protection to the underlying cement. It is remarkable with

what tenacity these caps will adhere, even in cases where it has been impossible to prevent the moisture from coming in contact with the cement before it has set. For these jackets and half crowns pure gold is most satisfactory.

SHORTENING ELONGATED TEETH.

Pacific Coast Dentist, May.

Dr. W. J. Younger reported a case where the teeth had been cured of Riggs disease but it left two of the front ones too long. To shorten them, the pulps were removed, the teeth cut off at the gums, a section corresponding to the elongation was taken from each root, a screw post was fastened into each crown and cemented into the roots, just as if artificial crowns were used. This operation was in the same mouth reported elsewhere in the book, where the jaws were contracted to close space caused by loss of teeth.

ORTHODONTIA.

TURNING BOTH UPPER LATERAL INCISORS AT THE SAME TIME BY THE USE OF A TRAPEZE, AND BY THE LONG-BAND MECHANISMS.

DR. J. N. FARRAR, NEW YORK.

Ohio Dental Journal, June.

For turning a single tooth there are several mechanisms, but the construction of all of them is based upon applying the force off one side of the long axis of the tooth, or in other words, they all operate upon the principle of the lever operated from a fixed anchorage. These levers may be of considerable length, or only a short knob; each is soldered to a ferrule and cemented upon the tooth. The anchorage to the engine of force lies in some other tooth, generally made practicable by some kind of band upon it.

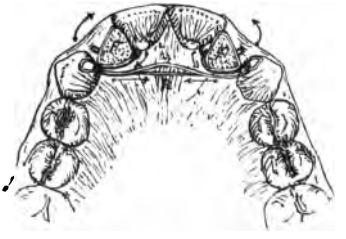


FIG. 1. Turning Laterals in opposite directions by the Trapeze Mechanism.

FIG. 2. The Mechanism in separated parts.

One of the objects of this paper is to show a mechanism that acts from an anchor that has no connection with any other tooth than the one to be turned; indeed, the anchorage is suspended in mid air. This mechanism also can act upon two teeth simultaneously. To show the difference between this and the other kind of mechanism other cases will be presented, but these will also have other points that may be of interest.

TRAPEZE OPERATION.—Fig. 1 illustrates an operation per-

formed on a boy, requiring the turning of two upper lateral incisors. The operation was performed by what I denominate a "trapeze" mechanism, so called because of its resemblance to the trapeze of the gymnasium. Fig. 2 represents the different parts detached; the dotted lines show their relation when in use. The mechanism consists of a rubber ring R; two thin platinum ferrules F F, each having a hook and a staple; H O a gold wire rod; W having soldered to each end a ring, through which to play the rubber. This rod W is of sufficient length to extend across the dental arch and project a short distance beyond the laterals, as shown. After the ferrules are so arranged (and cemented) upon the laterals that the hooks face each other, the rubber ring is stretched from the hook on one ferrule through a ring on the rod W, thence along the rod through the ring on the other end, and then caught upon the hook of the other ferrule. (See Fig. 2.) The rubber ring being thus stretched along the lingual surfaces of the laterals draws the hooks toward the rings on the ends of the rod W, and thus turns the teeth.

As the application of the rubber and rod is somewhat difficult for a beginner, it may be well to further explain it. Two pieces of string about eight inches in length are projected through the rubber ring, and then by them it is stretched through the two rings of the rod and held there stretched by the strings to prevent the rubber from drawing back, until the rod and the rubber are carefully placed in the mouth and the rubber is caught upon the hooks H H. This may be aided by a right-angle plugger. These hooks are soldered close to the gum margins of the ferrules, so that when the rubber is stretched through the rings on the rod which project beyond the laterals, it is enabled (the rubber) to draw oppositely outward and not slip off the laterals. To aid in turning the laterals further, if necessary, after they are moved outward sufficiently, another rubber ring (see the next figure) is stretched along the labial surfaces of the centrals, and caught upon the staple-like hooks O O, on the labial side of the ferrules; these hooks, when first soldered to the ferrules, are rings, afterwards cut open.

If one lateral requires to be turned further than the other, and it is desirable to correct both at the same time, a corresponding difference in the length of the lever hooks on the two ferrules may be resorted to. In this case, however, I did not resort to making the

levers of different lengths, but continued to turn both the laterals until the lagging one was in its proper position, where it was held, and then the other was given its liberty to return; when it had turned to its proper place it was stopped and held stationary.

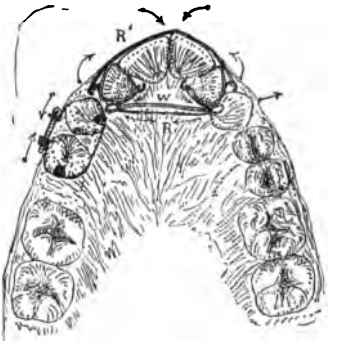


FIG. 3. Similar case.

These laterals were retained in place by two-arm ferrules, each consisting of a piece of platinum wire soldered to the labial surface of a ferrule (pure gold). These were cemented upon the teeth with phosphate of zinc, and were worn one year.

Fig. 3 illustrates the beginning of a similar operation for the correction of another case of this class. In this figure both the labial and lingual rubber rings, R R, are represented. To make

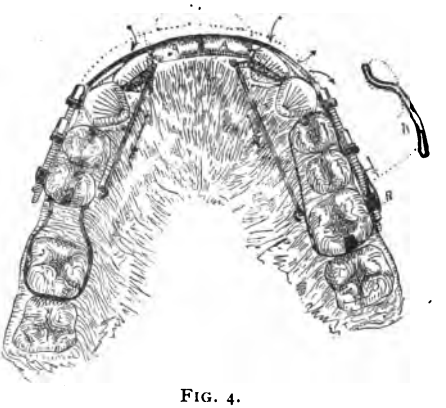


FIG. 4.

room for the right instanding lateral, outside of which stood the cuspid, first the bicuspid was extracted and the cuspid drawn back by a clamp-band anchored to the second bicuspid. This left a space

behind the bicuspid that eventually closed by the natural moving forward of the molars.

Fig. 4 illustrates the last stage of an operation performed for a robust girl about eighteen years of age. The patient formerly had protruding upper teeth in a V arch. By wrong advice, before I saw the patient, she had the centrals extracted and substituted by artificial teeth mounted on a hard rubber roof plate. Although her personal appearance had in a measure been improved by this treatment, her facial contour still retained much of the protruding expression.

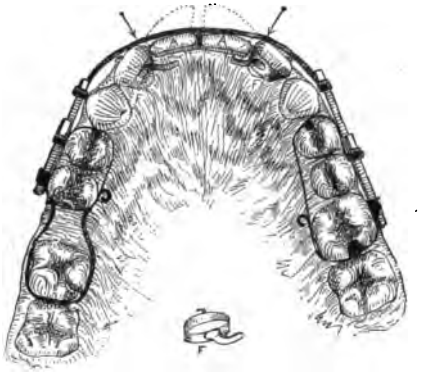


FIG. 5.

When the patient applied for treatment the laterals, as well as the artificial centrals, protruded sufficiently to rest upon and slightly project over the lower lip, causing it to roll outward. The arch having been originally of a V form, these laterals stood in a position requiring them to be turned, as well as moved posteriorly. See Fig. 5.

The first step in the new operation was to secure sufficient anchorage for the mechanism. This was obtained by embracing the side teeth in two clamp-bands, each having a hook soldered on the lingual side. On the left side the bicuspids and the first molar were included in the clamp-band, but on the right side only the bicuspids were included in the (other) band. The first molar having been lost, the second molar was pressed into service by a round platinum wire loop soldered to the posterior part of the band. The next step was the cementing upon the laterals the ferrules.

Having placed these pieces upon the teeth, a long band B,

Fig. 6 (made of round, stiff, platinum wire), supporting upon its middle part two plate centrals, A A, was attached to these anchors by screws, which when tightened upon, two or three times per day, caused the lateral to gradually move inward (see dotted line).

As soon as these teeth had become loosened by this draught upon them, two rubber rings were added within the dental arch to turn them; these were caught upon the hooks on the lingual sides of the anchor bands, thence stretched anteriorly and caught

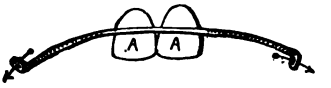


FIG. 6.

upon levers on the ferrules of the laterals as represented. A third rubber ring was added on the buccal side to aid in drawing upon the left lateral. R at the right of the figure shows the form of this rubber.

While these changes in the position of the teeth were going on, the artificial teeth followed the changing line of arch, by the tightening of the wire (long-band), by turning the screws, connecting it with the anchor bands. The correction of this case was

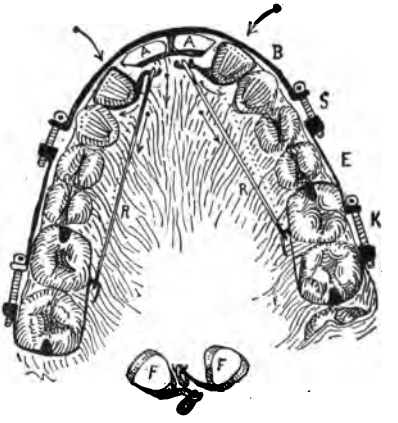


FIG. 7.

slow, but very successful, and satisfactory every way. The artificial teeth appeared so natural that the patient passed in society without anybody suspecting that they were artificial; indeed, the wire holding them seemed to be simply a regulating band resting across the front side of the dental arch.

Fig. 6 illustrates the closing stage of an operation for the correction of a similar case by a similar mechanism. The difference between the two mechanisms mainly lies in the anchor band connections E, with the long-bands. The arrows indicate the direction of movement of protruding lateral incisors.

This case is the first that was corrected by a skeleton mechanism bearing artificial teeth.

Fig. 7 illustrates a similar operation for correction of a similar case.

ENAMELING RETAINING APPLIANCE.

DR. GRANT MITCHELL, CANTON, O.

Ohio Dental Journal, February.

After the teeth have been regulated, make the retaining bands of platinum plate of suitable gauge, solder with pure gold, coat the labial surface with properly shaded enamel, and bake.

A NEW METHOD OF APPLYING FORCE IN THE REGULATION OF TEETH.

DR. EDWARD H. ANGLE, MINNEAPOLIS, MINN.

Dental Digest.

For a long time the writer has been experimenting with a novel way of exerting force to a moving tooth, and so well pleased is he with the results, that he is convinced the plan is destined to occupy a permanent place in orthodontia.

The power is derived by the lengthening of wire resulting from pinching or compressing its bulk laterally between suitably formed beaks of strong pliers.

In order that the reader may become familiar with this method of exerting pressure in the movement of teeth, a few cases from practice will illustrate a few of the many modifications to which it is susceptible.

Fig. 1 shows an inlocked incisor being moved outward. A

rod of metal of suitable length to extend from the anchor tooth and bear against the moving incisor is held in position by one end being made to rest in a pit formed in the enamel of a deciduous

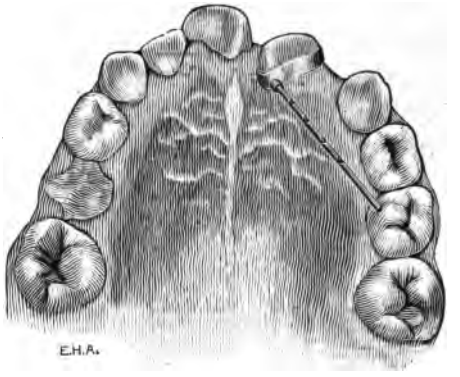


FIG. 1.

second molar, which has been selected as the anchor tooth. The other end of the wire is secured in a section of tubing soldered to an accurately fitting band cemented upon the incisor. Force is exerted upon the moving tooth by occasionally pinching the wire with the regulating pliers shown in Fig. 2.

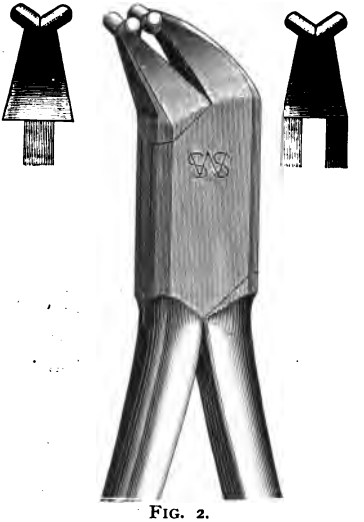


FIG. 2.

Each pinch of the wire causes it to be lengthened about one-hundredth of an inch. The shaded depression in the wire well shown in the engraving illustrates the pinches made by the

pliers. Two or three pinches each day or alternate day will be found sufficient to rapidly move the tooth into its desired position. In the case here shown the movement of rotation as well as outward being necessary, the force was directed against one side of the tooth, thereby accomplishing both movements at the same time.

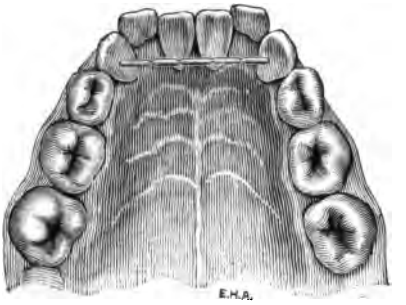


FIG. 3.

After the tooth had been moved into the desired position, it was retained for a few days by the appliance shown, after which the appliance was removed and the further retention of the tooth effected by the proper occlusion of the opposing inferior incisors.

Fig. 3 shows another case in which a modification of the same plan was used in moving outward two inferior deciduous cuspids which were becoming bunched as the result of lateral pressure. Pits were drilled through the enamel on the lingual surfaces of the cuspids into which was made to rest the ends of the wire to be

FIG. 4.

lengthened. In this case it was not only necessary to move outward the inferior cuspids, in order to provide space for the inferior incisors, but also to move outward the superior deciduous cuspids

that space might be provided for the incoming superior incisors. This was accomplished by their occlusion with the inferior cuspids, as shown in Fig. 4, as the wire was gradually lengthened by pinches from the regulating pliers. As all four cuspids were being moved outward, it was necessary that the process should be

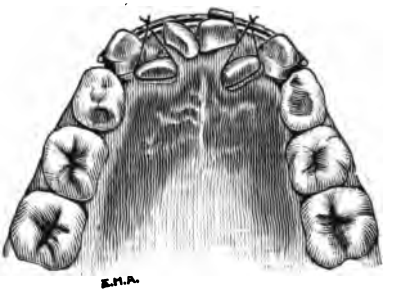


FIG. 5.

most gradual, hence the wire was lengthened but once a week. After sufficient space had been secured, it was maintained by the lengthened wire already in position until all the incisors had become fully erupted and firmly established in their normal positions.

Fig. 5 shows a modification of the above plan in a similar case in which the ends of the wire to be lengthened were soldered to the labial surfaces of accurately fitting bands cemented upon the

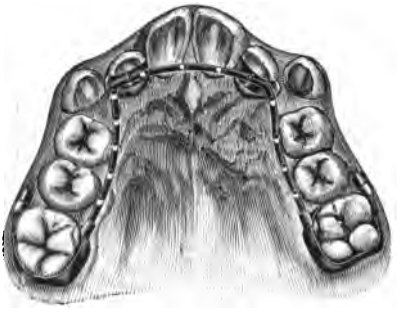


FIG. 6.

deciduous cuspids. As the cuspids were gradually moved further apart the incisors were moved outward by wire ligatures, occasionally tightened by twisting the ends, which should always be left one-eighth of an inch long and bent not to interfere with the lip.

Fig. 6 shows the application of this method in treatment of a very common form of dental irregularity, in which it is desirable

to exert pressure outward upon the bicuspids as well as forward and outward upon the lateral incisors, in order to provide space in the arch for the erupting cuspids. The first molars were selected as the anchor teeth, and encircled by the adjustable clamp bands, to which were soldered sections of tubing which served as sockets into which rested the ends of the wire to be lengthened. This wire was bent to conform to the inner circle of the dental arch and was held in position by its anterior part, resting in staples, soldered to the lingual surfaces of bands accurately fitted and cemented upon the lateral incisors. The united ends of the bands were left about one-sixteenth of an inch in length against which rested the sharp curves of the wire.

By pinching the wire with the regulating pliers in the region of the bicuspids the incisors were moved forward, while pinching the wire between the laterals forced the laterals further apart, thus providing space for the central incisors. The bicuspids were gradually moved outward by the wire resting in contact with their lingual surfaces, pressure being exerted by forcing the wire against them with each pinch of the pliers.

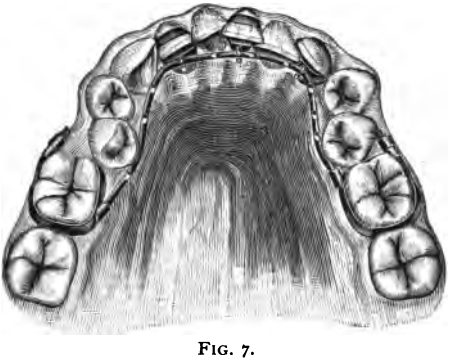


FIG. 7.

The reader will be surprised to know how much lateral pressure may be brought to bear upon the bicuspids, or in all similar cases, by forcing the wire against the teeth just at the instant it is being pinched; but in cases where extensive lateral pressure is necessary, as in the following case, a piece of rubber stretched between tooth and wire will be very effectual. After the rubber has moved the tooth it should be removed, and the wire bent outward against the tooth, when the rubber may again be applied if necessary.

After the teeth had been moved into the desired position they were retained by the device already described for their movement, which will be found nearly the ideal retaining appliance in all similar cases, as it is so cleanly, compact, and efficient—is not under the control of the patient, and can be worn any length of time without inconvenience.

Fig. 7 represents a case in which a bunched and overlapped condition of all the lower teeth anterior to the molars existed, necessitating a general enlargement of the arch in the region of these teeth, which was accomplished after the methods already described and the device so clearly shown in the engraving, which was also used as a retainer after the teeth had been moved outward.

It is not to be supposed that this method will supersede the use of the jack-screws, although in many cases it will be found more desirable, as it is extremely simple and compact. Its greatest place of usefulness will be found in the movement of the teeth of young children, where great force is necessary and the smallest of appliances desirable.

The wire for lengthening may be made of platinized gold, silver, brass, or what is much beter than all a fine quality of German silver, which takes the desirable degree of temper at the point of pinching, so that the wire maintains the same stiffness as if the depressions by pinches had not been made.

The most desirable size, as well as materials, is found in the author's appliances for regulating the teeth and is known as the anchor and retaining wire G.

The regulating pliers shown in Fig 2 are beautifully adapted to the work for which they are intended, and are so shaped as to reach all parts of the mouth. They should never be used in pinching large or hard wire, or they will be injured so that evenness and accuracy, so necessary, will be impossible.

CLOSING A SPACE IN THE DENTAL ARCH BY REGULATING.

Pacific Coast Dentist, May.

A case is reported successfully treated by Dr. W. J. Younger, where, by Riggs disease, a patient lost the right superior lateral

and the two inferior centrals and right lateral, thus making wide gaps in each jaw, which was remedied in the upper arch by contracting the jaw, and in the lower arch by contracting the arch, implanting a tooth and cutting off one of the remaining crowns and replacing with a broader one.

[It is to be regretted that the journal quoted did not give details of contracting the arches.—ED. COMPENDIUM].

ESTHETIC CORRECTION OF FACIAL CONTOURS IN PRACTICE OF DENTAL ORTHOPEDIA.

DR. C. S. CASE, CHICAGO.

Dental Cosmos, November.

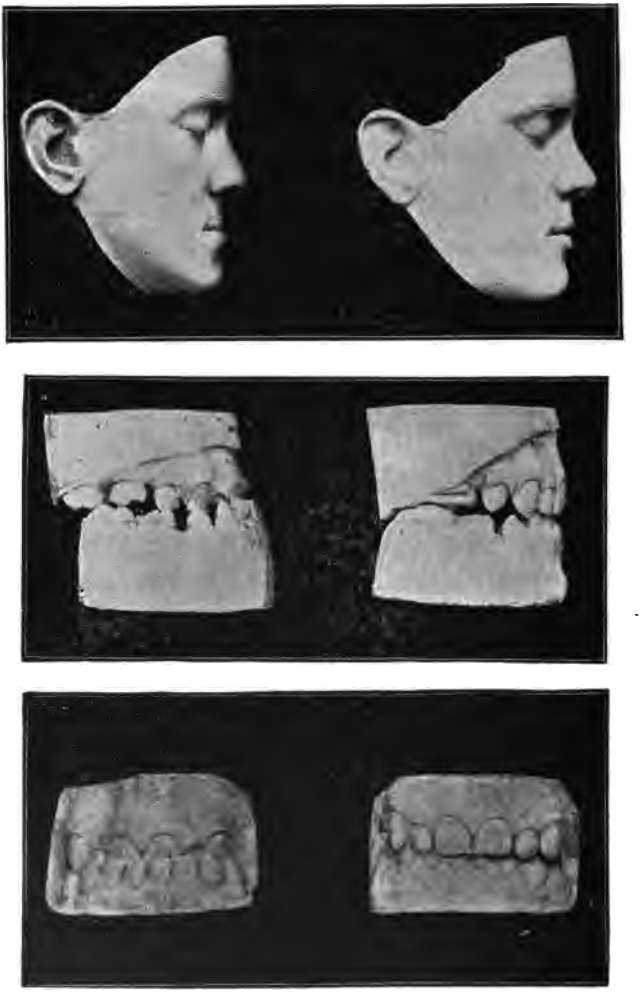
A few of the pictures of expression before and after the operation will give an idea of the work Dr. Case is doing. The models of the jaws before and after the operation will show their conditions.

In speaking about the method of procedure, the author says: The limited area upon which force can be applied to a tooth, compared to that portion covered by the gum and imbedded in a bony socket, has made it next to impossible, with all ordinary methods, to move the apex of the root in the direction of the applied force; nor could this ever be accomplished with force exerted in the usual way at one point upon the crown, however near the margin of the gum it be applied, for the opposing margin of the alveolar socket must receive the magnitude of this direct force, and in proportion to its resistance it will become a fulcrum, exerting a tendency to move the apex of the root in the opposite direction.

But if in the construction of the apparatus a static fulcrum is created, independent of the alveolus, at a point near the occluding portion of the crown, while the power is applied at a point as far upon the root as the mechanical and other opportunities of the case will permit, the apparatus becomes a lever of the third kind, the power being directed to a movement of the entire root in the direction of the applied force.

This proposition is made plain by reference to the diagrams. In Fig. 3 let A be a point upon a central incisor, at which force is

applied in the direction indicated by the arrow; then will the opposing wall B, of the alveolar socket, near its margin, receive nearly all of the direct force, and in proportion to its resistance will there be a tendency to move the root in the opposite direction.



This proposition will also hold good even if we apply the force at A, Fig. 4, or as far upon the root as may be permitted, by attaching a rigid upright bar C, to the anterior surface of the crown; the only difference being that we distribute the direct force over a greater area. But if, as in Fig. 5, we attach to the lower end of C

a traction-wire or bar F, and further enforce the mechanical principles of our machine by uniting its posterior attachment to the anchorage of the power bar P, we will have neutralized our anchorage force materially and created an independent static fulcrum at D. Our apparatus now will distribute its force over the entire root, and give us complete direction and control of whatever power we put into it.

The entire tooth can be carried forward bodily, or either end can be made to move the more rapidly. The force thus directed to the ends of the roots will have an increased tendency to move the more or less yielding cartilaginous bone in which they are imbedded.

For material for regulating appliances German silver is preferred, not because of its inexpensiveness, but because much experience with all metals has taught me that none possess the same favorable qualities for this work.

The bands which surround the teeth should be wide and thin. If No. 10 B. & S. gauge wire is rolled to four, or four and a half thousandths of an inch, it will usually be about the right width. This banding material should be drawn firmly around the natural

teeth, the ends bent sharply to a right-angle for the joint. When these are soldered, the joint should project about a thirty-second of an inch, with its sharp corners clipped. Then the bands should be carefully fitted and burnished to the teeth, with the joints a little to one side of the center of their anterior faces, to allow the upright bar to take its proper position, exactly in the center and parallel with the long axis of the tooth, and also to serve as a strengthening girder to the attachment. These and other small details may seem unnecessary, and yet, practically, they are of vital importance

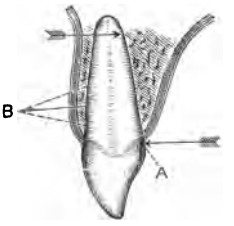


FIG. 3.

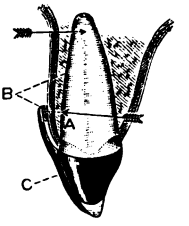


FIG. 4.

in the construction and application of the apparatus. It will be remembered that I originally made these upright bars of flattened No. 18 wire, leaving the ends long enough to bend over when in place, and clasp the force bars. The operation of bending the bars was often a difficult and painful one, especially when it became necessary to remove and recement a band.

For upright bars I now cut pieces from Nos. 15 or 16 wire, about three-fourths of an inch long. These are filed slightly at the middle to receive the band, to which they are firmly soldered in the

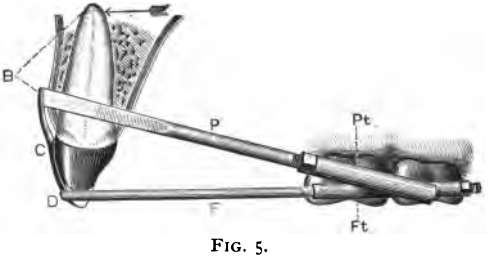


FIG. 5.

position described. Then they are bent and filed so as to fit perfectly the face of the tooth against which they are to rest. They should also follow the curve of the gum, nearly touching it, and extend above its free margin about one-fourth of an inch. The

perfecting of these can only be accomplished at the chair. Finally the bar is shaped with a file according to whether force is to be applied in an anterior or a posterior direction.

I will first describe the method of procedure for cases which require a forward movement of the roots. In cases of this character I have never found it necessary to apply force to other roots than those of the incisors. The cuspids are usually retarded from taking their positions of alignment by the posterior position of the incisors, and are frequently so prominent that it first becomes necessary to force the crowns of the incisors forward with jack-screws or otherwise before the contouring apparatus can be effectively placed.

Usually in those conditions when the cuspids interfere, the upper ends of the upright bars can be at first ligated to the power bar, and thus the incisors forced forward until the power bar can be slipped into its proper position, which, as will be described, is always back of the upper end of the upright bars, against which it presses for the purpose of exerting force as high as possible upon the roots to be moved.

The posterior surface of that portion of the upright bars which stands in front of the gum is filed flat, so that their antero-posterior thickness tapers to one-half their original diameter at the ends, where they serve as rests for the power bar.

The anterior surfaces of the ends are rounded and polished to a thin edge. These ends should not extend above the upper edge of the power bar, unless it seems necessary to bend them at the extreme end to form a catch to prevent the power bar from sliding up.

The lower ends are grooved with a small round file to receive the fulcrum bar, which is a wire (No. 22 or 20), threaded only at one end in the No. 12 or 11 hole of the Martin screw-plate, the other end being held in place by bending it back after passing it through the lower anchorage tube.

The power bar should be made with the greatest care, in order that it be of the required rigidity and strength. Extra hard German silver wire, No. 10, should be drawn without annealing to Nos. 13 to 16—the size being regulated by the probable power necessary, and also by the distance from points of attachment and application. In other words, when the anterior end of the anchorage tube (Pt) at which the nut works is even with the bicuspids or at no great distance from the points of applying the force, less

rigidity of the bar will be requisite; and again, for very young patients or where little power will be needed for the required movements. Ordinarily, however, No. 13 will not be found too large.

When it has been drawn to the proper size or selected and cut about the right length, that portion which is to extend between the right and left first bicuspids should be flattened in the rollers to about one-half its diameter. Then it should be bent so as to conform to the shape of the gum along the line where it is to rest. After bending closely over the cuspids, it should extend straight back into the tubes, into which its threaded ends should pass from one-half to three-fourths of an inch.

The construction of the anchorage attachment which now remains to be described is of the greatest importance to the ease and accuracy of its application and subsequent usefulness.

Two molars, or the first molar and a bicuspid, and sometimes all three, should be selected for the anchorage teeth. When these are accurately fitted with wide bands, an impression in compound, of one side at a time, including the cuspids, should be taken. The

bands should then be removed from the teeth without bending, and carefully placed in their proper position in the impression, which should be filled with Teague's or other investing compounds. You now have the bands upon a small model that will hold them firmly in their proper relative positions during all the soldering process.

As the position and mechanical perfection of the power tube (Pt, Fig. 5) is of paramount importance, it should receive first attention.

Select a strong tube one-half or three-fourths of an inch long, that loosely fits the threaded end of the bar. Its anterior end should be placed so that the nut will work freely upon the bar without impingement upon band, tooth, or gum, and it should take a direction that points exactly to that place upon the cuspid over which the power bar is to extend. In order to strictly observe this important direction, it usually becomes necessary to raise one or the other end of the tube from the bands by the intervention of lifts. It is often convenient to rest its posterior end upon the lever tube, its sharp projecting edges being rounded so as not to irritate the cheek.

The lever tube (Ft, Fig. 5) should also loosely fit its bar or wire, and be soldered directly to the bands, which it firmly unites, and thus serves to give statical strength to the anchorage. Their direction is not as material as that of the power tubes, because of the smallness and flexibility of the lever wire. Their posterior ends should project sufficiently free from the other parts to admit of the working of the nut. And in those instances where reciprocating rubber bands are to extend to a lower appliance—the advantage of which has been explained elsewhere—allow these tubes to project for that purpose, finding them much more convenient than the buttons which were formerly used.

The tubes now being fitted with their joints turned toward the bands, they are attached with an abundance of silver solder, the bands also being united along their approximal surfaces.

All the parts which have undergone the soldering process are now boiled in sulphuric acid to remove the borax and oxid, after which the entire apparatus is polished and heavily gold-plated.

The teeth being properly separated with wax tape, the an-

chorage appliances should first be fitted to place in the mouth, and the cement allowed to harden before proceeding further, to prevent dislodgment by the force necessary in placing the power bar in position, especially as it often becomes necessary to remove and rebend the bar several times in the final perfecting of its shape.

With the anchorage appliances and power bar in place, the bands for the anterior teeth may now be fitted and cemented, allowing the upper ends of the upright bars to rest in front of the power bar. Finally, the lever bar is placed, and the contouring apparatus is ready to commence the application of force at the next sitting.

FIG. 6.

An apparatus for moving the roots of the anterior teeth in a posterior direction is in the main constructed quite similarly. (See Fig. 6.) The power bar now being used for traction force, the same rigidity is not as necessary as in the other apparatus. I find, therefore, that a No. 16 wire, not flattened in front, is of sufficient size. The other, or lever bar, the force of which acts in the opposite direction to prevent the occluding ends of the teeth from being drawn back, should be as large as No. 18. It should be flattened in the same manner described for the power bar. The upper ends of the upright bars are grooved on their anterior surfaces to form a rest for the power bar; while a shoulder is filed on the posterior surface of the lower ends, which forms a slot, when in place, for the flattened lever bar to rest.

It being understood with this apparatus that the power bar nuts work at the posterior ends of the tubes, while those of the lever bar work at the anterior ends. Proper provisions for this arrangement should be made when constructing the anchorage appliances.

ESTHETIC REGULATING APPLIANCES AND ANCHORAGES FOR SAME.

DR. J. N. FARRAR, NEW YORK.

Ohio Dental Journal, March.

The writer, in speaking on the esthetic in mechanism, says: Failure may arise from lack of skill on the part of the operator or by perversity of the patient. But many failures can be traced solely to the disgust of patients, through lack of esthetics in the mechanisms; because conspicuously black and filthy mechanisms do not encourage the patient. There have been many failures, by the use of such things, that would have ended in a glorious success if delicately and beautifully made gold mechanisms had been used.

ANCHORAGE PROPER AND IMPROPER.

When the first molar has been extracted it becomes necessary to use the second and third molars for anchorage, to move back the bicuspids; but they should not be drawn upon for moving more than one tooth at a time, and even then these anchor teeth should be frequently examined to prevent too great inclination forward. If they have moved too far, they should be given liberty, permitting them to return to their normal positions. It should not be inferred from this, however, that the starting forward only a short distance is dangerous to these teeth, as all anchor teeth are liable and even expected to be moved somewhat by the draught. The question to decide is, how long such started anchor teeth can be safely used to further the operation. If the antagonism is not broken too much these teeth will generally settle back into their former and normal places, even if they are elevated slightly in their sockets. If elevated, however, it may require months. Because of this natural tendency to settle back and down into the sockets, it is not prudent to be in too great haste to grind teeth to improve antagonism after having completed the operation of moving teeth.

In planning a mechanism for moving teeth, one of the main points to be taken into consideration is enduring firm anchorage. Always include for anchorage all the teeth that are practicable, not only to prevent their being moved, but also to prevent soreness of the sockets. The exceptions to this rule of practice are in cases

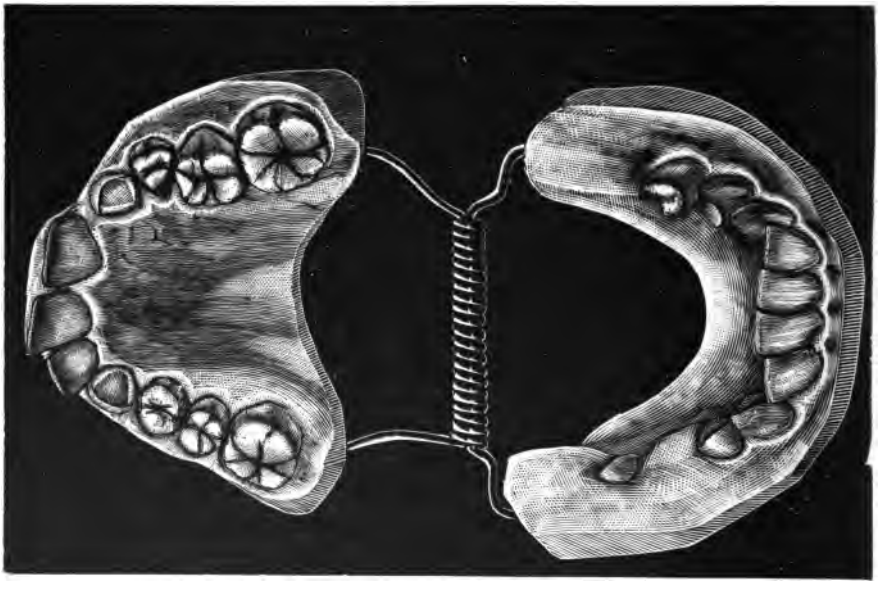
where a sufficient number of teeth cannot be taken advantage of for anchorage, or where it is necessary to move anchor teeth forward to aid in filling extra space.

TREATMENT OF IRREGULARITIES OF THE TEETH WITH CASES.

DR. A. E. MATTESON, CHICAGO, ILL.

Dental Review, December.

"The deciduous dental arch is always well formed and the position of the teeth are regular (mere freaks of nature excepted). But from this perfectly symmetrical dental arch there develops with the growth of the permanent set some of the most astounding abnor-



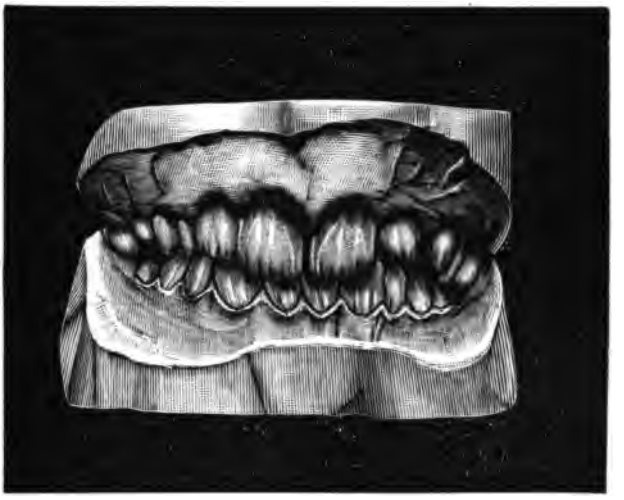
Norman M. No. 1.

malities. . . . . In the departure from symmetry they assume almost every variety of position, so that it would be almost impossible for the human mind to conceive of an irregular arrangement which would not find its counterpart in nature."—KINGSLEY.

It is to the consideration of some of these abnormalities your

attention is called. To this end will be presented that class of deformities produced by the excessive eruption of the anterior permanent teeth of both jaws. This extrusion of the teeth is caused to a certain extent by heredity and by the lack of occlusion, and is governed by the same law which holds that any tooth which has no antagonist will extrude. The earlier in life this occurs, the more pronounced it becomes.

This condition destroys what might otherwise form a harmonious expression—the normal occluding edge of the upper anterior



Norman M. No. 2.

teeth, gums, and process falling excessively below the parting of the lips, when the features are in repose, requiring considerable effort to close the lips when the other teeth of the two jaws are in contact.

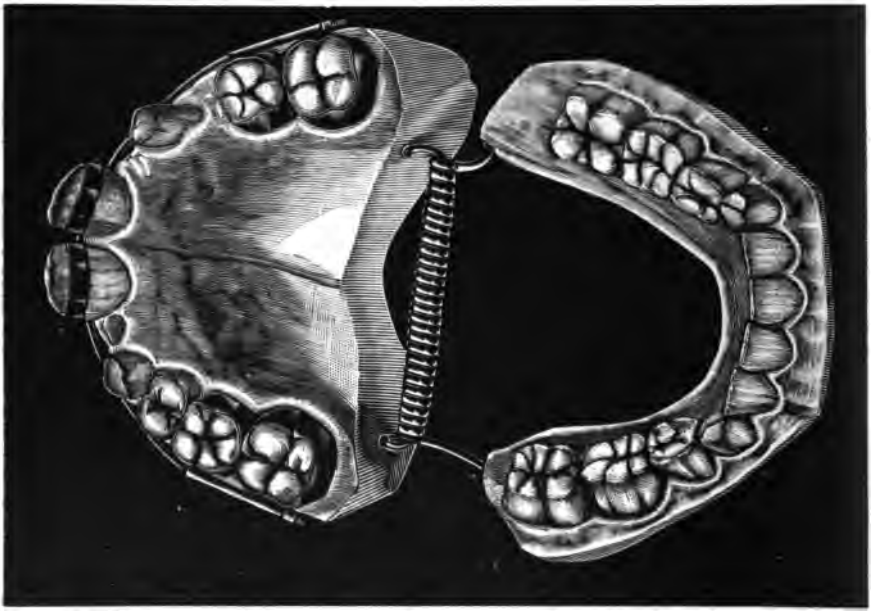
The correction of these cases should be undertaken as early as a tendency toward the deformity is apparent, usually about the ninth year, and previous to the time for shedding the second deciduous molars—that advantage may be taken of them for securing the necessary anchorage of regulating appliances—and before the permanent incisors are fully developed.

The reason for preserving the deciduous molars is in no instance more manifest than where an irregularity is impending and the need of corrective measures indicated.

If, however, from any cause these deciduous molars are lost,

corrective measures in the class under consideration would best be delayed until after the development of permanent teeth is sufficient to afford anchorage of suitable appliances. In the meantime the deformity becomes more marked and difficult to reduce—involving the whole arch, and the operation for correction is so extensive that few patients are possessed of sufficient courage and perseverance to carry it forward to a successful termination.

In the cast marked "Norman M." it will be observed that in



Lester B. No. 3.

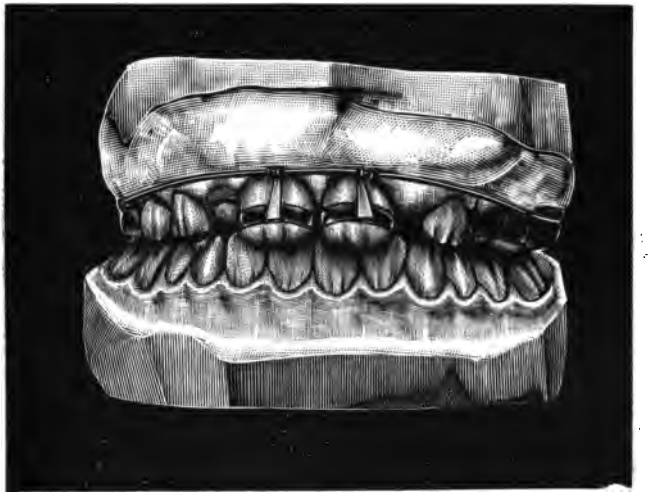
the upper jaw on the left, the lateral incisor has not erupted, although the second bicuspid has. The first permanent molar has an extensive cavity opening into the pulp chamber and containing a putrescent nerve pulp. On the right side both the bicuspids have erupted and the first molar is in fair condition. In the lower jaw—left side—both bicuspids have erupted, also the first bicuspid on the right, while the first molars on both sides are missing and the second molars are on the point of erupting.

This deformity is further increased by being accompanied by a receding chin. It is difficult to determine what means might be best employed. The inclined plane, possibly, although this

has never proved satisfactory in the practice of the writer. Or force might be exerted from without the oral cavity and an inclined plane within.

Observing the case marked "Lester B," we find the right lateral incisor erupting inlocked with the lower teeth (in occluding) quite a space between the centrals, both the second deciduous molars in place, and having antagonizing teeth in the lower jaw, and the first permanent molars perfect.

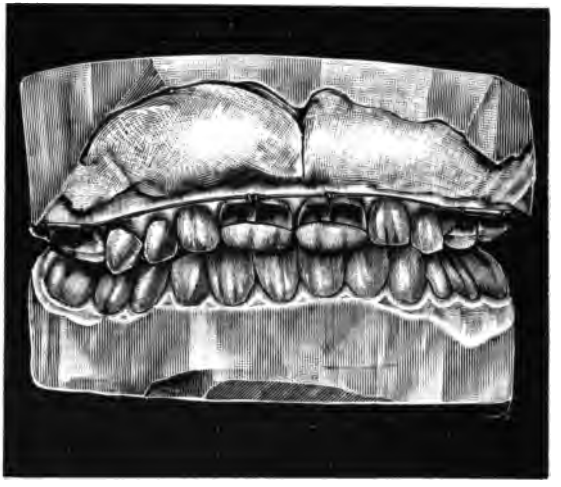
The successful correction of this case was comparatively simple. The appliances were constructed of German silver as follows:



Lester B. No. 4.

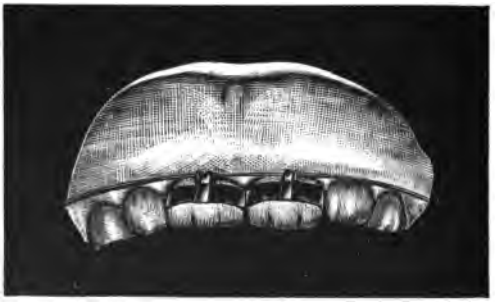
Bands in the form of a figure eight were fitted to the first permanent and second deciduous molar on each side. To these bands on the buccal surface, and on the same horizontal plane, tubes were soldered. The lateral was banded, and on the lingual surface was soldered an open (wire) ring. Bands were fitted to the central incisors, embracing them near the incisive edge; on the labial surface of each band was soldered a triangular shaped strip of plate $\frac{1}{10}$ of an inch across at its base, and the other two sides $\frac{5}{16}$ of an inch in length. To prevent the solder from flowing the whole width of the band a scale of mica was inserted. The points of these strips extended a trifle beyond the gingival margin. The mesial edges were placed parallel, for reasons to be explained later.

A hard drawn wire (No. 20) was formed so as to extend around the labial surface of the teeth, but not in contact with any but the central incisors at the gingival margins, the ends passing freely into the tubes on each side. The ends of this wire were threaded and nuts prepared for them.



Lester B. No. 5.

The place on the wire where the distal edges of the strips crossed it was marked, the wire removed and rings of smaller wire slipped to the marks and soft soldered without heating enough to draw the temper. After electro-gilding, the bands were cemented



Lester B. No. 6.

to the teeth and allowed twenty-four hours to harden. The wire was inserted into the tubes and brought to place. A rubber ligature was looped over the wire, around and into the open ring back of the lateral.

With pliers—one lip resting on the bases of the triangular strips and the other on their opposite points—the strips were curled over the wire. This was repeated two or three times a week, or as often as the soreness subsided.

This shortening of the strips around the wire, which acted as a spring, forced the teeth into their sockets; while the wedge formed by the incline of the distal edges of the strips against the rings on the wire brought the mesial surfaces of the centrals together.

After the incising edges of the teeth had been brought to their proper alignment, the nuts were moved forward on the ends of the wire until the centrals were forced back into occlusion with the lower teeth.

The same principal may be used to advantage in cases of retarded eruption not determined until later in life, by reversing the position of the triangular strip on the band against the wire, producing reverse action; or it may be used conjointly when one tooth requires subtruding and the other extruding, in which case reciprocating force is made available.

LUXATION OR THE IMMEDIATE METHOD OF TREATING IRREGULAR TEETH.

MR. GEORGE CUNNINGHAM, ENG.

Dental Record.

Many interesting cases treated by the author after this manner are illustrated. His modus operandi is as follows:

All the teeth should be thoroughly scaled, cavities filled, and an alcoholic saccharin wash used several times a day before operation.

On day of operation. Brushing the teeth and bathing them with saccharin wash—better with H_2O_2 than H_2O for dilution—same wash after the operation and frequently next few days.

It is well, except in the simplest cases, to have studied a model, making the rearrangement of the teeth on a duplicate model. If a splint can be prepared from this ready for use immediately after the operation, so much the better.

All being ready, cut the alveolus with a thin circular saw, $\frac{7}{8}$ inch to $1\frac{1}{4}$ inch in diameter, not thicker than thin note paper, into

such sections as are necessary. This is quickly done, and can be borne quite frequently without any anæsthetic. Forceps, elevator, or other instrument is used for pushing, pulling, or rotating the tooth sections into place. Forceps should have the beaks guarded. I use copper sheaths molded and soldered so as to fit the beaks fairly tightly. Rubber sheaths, soft or hard, will also do. Dr. Bryan's special forceps with curved support for bringing a tooth inside the arch into line seems well adapted for this purpose. Moving teeth backward or rotating teeth out of line into the arch is much facilitated when a badly carious neighboring tooth is extracted. This extraction may be done at the time, but possibly better two days or so previously, as the local post-operative inflammation facilitates the bending and movements of the alveolus. In such cases the sectionizing of the tooth and its alveolus may be done with a pair of surgical bone cutters, or even with physick forceps. The wedge-shaped beaks of the latter are extremely useful when it is necessary to push the teeth backwards. The movement of the tooth or teeth into the desired position may be very easy, but often requires great strength carefully applied. One to six teeth have been so moved. The chief point in the operation is to move each tooth with its socket entire as far as that may be possible.

The teeth when in position should be ligated with silk or thin silvered steel wire, preferably the latter, or fixed in a splint. Thin German silver or platinum bands soldered together make a good splint.

Care must be taken in closing the teeth, as the articulation is almost certain to require adjustment by disking, etc. Carborundum wheels work quickest.

When finished, syringe thoroughly with peroxide, saccharin wash, especially any pockets or spaces marking the previous position of the moved teeth. Paint all the bleeding or cut surfaces with Richardson's styptic colloid. To a saturated solution of tannic acid in alcohol and ether (equal parts) pryoxylin (gun-cotton) is added as the liquid will dissolve (tannin collodion preparation). The pain has usually subsided by this time and the patient feels fairly comfortable. The patient should be seen next day in case the teeth have moved—syringing, styptic and cleansing, as before. If possi-

ble, continue this treatment for next few days, the patient always using the wash after meals. In a few cases new ligatures may be unnecessary; ligatures should be renewed or dispensed with as rebuired by the indications. A period of three or four weeks is usually ample time for retention by ligatures or splints.

REGULATING TEETH, SUPPLEMENTED BY CROWN WORK.

DR. F. M. WILLIS, AUGUSTA, GA.

Dental Cosmos, July.

A young lady, about sixteen years of age, presented herself with the following history: Several years ago she had the left lateral incisor and right first bicuspid of the upper jaw extracted by a dentist, to correct a slight irregularity. The result was that instead of remedying the condition, there was a general settling in of the entire upper jaw, resulting in a much worse condition than the first. The right superior central incisor was the only one of the upper teeth that touched the lower. There was a space of a quarter of an inch between the upper and lower bicuspids and molars when her jaws were brought together. (See Fig. 1.)

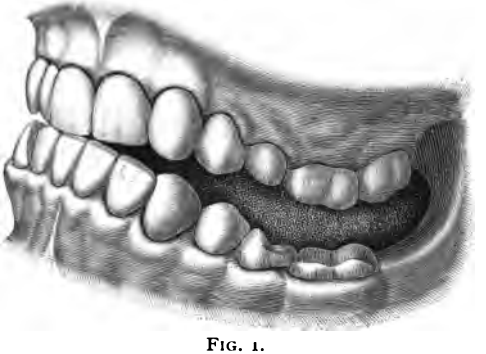


FIG. 1.

The patient was unable to masticate her food properly, and as a natural consequence she was suffering from indigestion so badly that she was unable to attend school, and her system was very much run down.

A split-plate, with a piano-wire spring, was made to spread the

upper bicuspids and molars. The patient wore this appliance for six weeks, calling once a week to have the spring opened as the case progressed. The upper molars and bicuspids were now directly over the corresponding teeth of the lower jaw, having been spread about a quarter of an inch.

The cuspids occupied about the right position, so the next step was to move forward the centrals and lateral incisors. A gold band was fitted around the right central, with a spud resting behind the other central and the lateral incisor. The left central and the lateral incisor were somewhat twisted on their axis, so the spuds resting behind them were bent so as to twist these teeth as they moved forward. A plate was made, covering the molars and bicuspids, with a piano-wire spring resting in a notch in the gold band behind the right central. This appliance was worn for a month. The incisors were now straight on their axis, and were far enough forward to allow them to shut outside the lower teeth. Now when her jaws were closed, there was less than one-sixteenth of an inch space between the bicuspids and molars of the upper and lower jaws.

The lower molars and bicuspids were badly broken down from decay, some of them having been filled half a dozen times. To put them in good condition and raise their grinding-surfaces to articulate with the upper teeth, they were crowned.

In order to avoid too much show of gold on the first bicuspids, a new method was resorted to in crowning them. A gold band was fitted around the tooth, extending about a sixteenth of an inch above the end of the tooth. An impression and bite were taken at the same time by covering the tooth and band with plaster and closing the jaws while the plaster was soft. The band and plaster were removed intact, and Mellott's fusible metal poured into the band and a pin stuck into the metal to hold in the plaster. The crown was placed on the articulator, and a bite completed with Mellott's metal and plaster. The plaster was now removed from the band, leaving a metallic surface one-sixteenth of an inch below the top of the band, against which to fit a porcelain top for the crown. In this case an ordinary plain tooth, such as is used in vulcanite work, was selected and ground to fit into the gold band and the right length to articulate

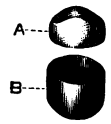


FIG. 2.
A, Porcelain tip.
B, Gold band.

with the upper teeth. This porcelain tip was cemented into the gold band, and the whole removed from the articulator. The fusible metal was heated a little, and readily came away from the crown. Fig. 2 represents the finished crown.

These crowns were cemented on in the mouth and produced a nice appearance, as nothing but the porcelain showed when the mouth was opened, the lip and tongue entirely hiding the gold band. A crown of this description is particularly advantageous for the lower molars and bicuspids, especially where they need to be brought up some distance above the natural tooth.

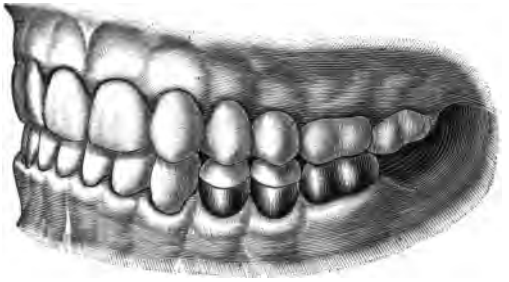


FIG. 3.

Such a crown can be made with absolute accuracy in one hour, and there is no risk of a fractured porcelain, as no heat is used.

Fig. 3 represents the case completed.

A very small retaining plate is worn to hold the upper teeth in position.

None of the appliances used in this case caused the patient any pain or great inconvenience. She can now masticate as well as any one, and is enjoying better health than for years previously.

MOVING TEETH EN MASSE.

DR. J. N. FARRAR, NEW YORK.

International Dental Journal, August.

To retract protruding front teeth, and to correct as well the facial deformity, Dr. Farrar constructs a mechanism as herein illustrated. The teeth are moved en masse. Fig. 1 shows the changes made in the position of the teeth.

[Dr. Case's method for accomplishing the same purpose, given elsewhere, differs in the mechanism used. The two methods are well worth studying.—ED. COMPENDIUM.]

As will be seen, the engine of force in the mechanisms for moving roots forward are placed within the dental arch, instead of outside of it, as in the essayist's cases. In the mechanism represented by this sketch (Fig. 2) the base of support is a transpalatine screw-jack, anchored by two clamp-bands, that embraces the side

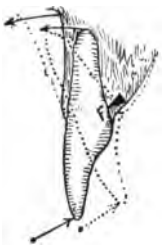


FIG. 1.

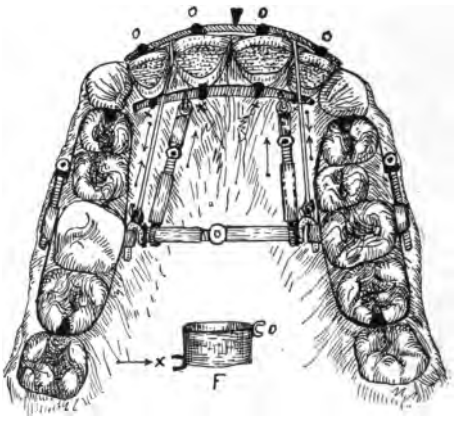


FIG. 2.
Mechanism for moving the roots forward en masse.

teeth; from this jack to the posterior sides of the necks of the incisors, and lying close to the sides of the arch, are two other screw-jacks to press against these front teeth; to hold these jacks upon them, each incisor has upon it a broad ferrule (cemented), with a U-shaped lug on the lingual side, near the gum (see F in lower part of Fig. 2), in which a bar connecting the anterior ends of the jacks rests. To hold firmly the ends of the crowns of the incisors, and prevent them from moving forward when these jacks are set at work against the necks of the teeth, they (the ends) are tied to the transpalatine jack by two wire cords, connecting with a cross-bar lodged in other U-shaped lugs soldered to the labial side of the ferrules, near the ends of the teeth, as represented by this sketch. (See Fig. 3.)

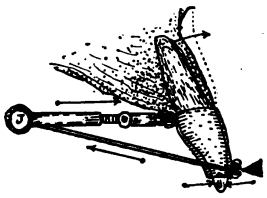


FIG. 3.
Showing the principle of applying compensating force.

In another mechanism I use more radial screw-jacks than in this one, for forcing the roots forward; these are arranged thus (see Fig. 4). The ends of the crowns are held fixed by a wire bow (see

Fig. 5) placed in U-lugs (see dotted line in Fig. 4), one being hooked into a wire ring soldered to the lingual side of one of the anchor-bands, and the other screwed to the corresponding side of

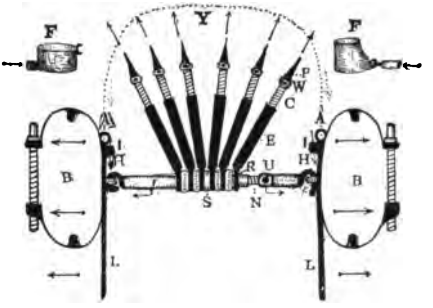


FIG. 4.
Radial screw-jack mechanism, for moving the roots of six teeth forward.

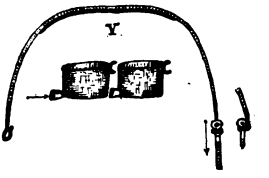


FIG. 5.
The check-bow belonging to the radial mechanism.

the other band. (See A A). It is a modification of my screw-acting long band.

Another and similar mechanism is made like this sketch (Fig. 6). It consists of two anchor-bands (B B), a transpalatine screw-jack with two hooks (H H), four ferrules (F F F F), a pushing bow (P), operated by nuts (N N), and stay- or check-cords (D D) with a cross-piece.

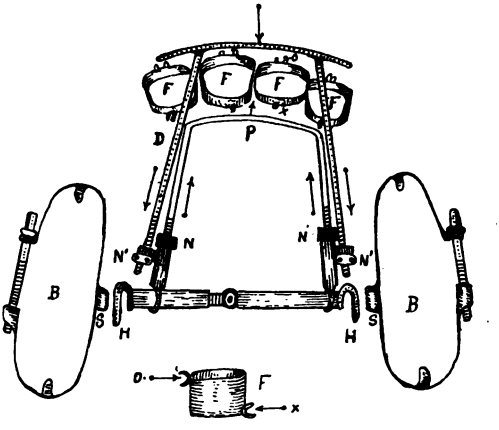


FIG. 6.
Mechanism for moving forward, en masse, the roots of the upper incisors.

This mechanism is operated by four nuts (N N, N′ N′) two to push the bow (P) forward, and two to draw the crowns backward.

The extremities of the arms of these rods play in smooth, bare tubes and nuts, as shown here.

The next figure represents another mechanism for the same purpose. (See Fig. 7.) It consists of two anchor-bands, two screw-

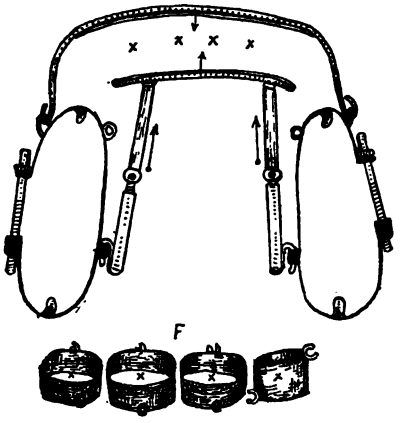


FIG. 7.
Mechanism for moving forward the roots of upper incisors en masse.

jacks soldered to a cross piece, four ferrules (F), and a wire bow. The main difference between this mechanism and the first one described (Fig. 2) is that there is no transpalatine jack, the anchorage of the two jacks being made directly upon the anchor-bands, by hooks and sockets, as here shown, or by solder, which is still better because more steady.

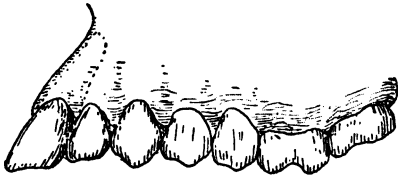


FIG. 8.
Representing an example of the class of cases that require the moving forward of the roots of incisors.

As will be seen, all these mechanisms are for moving forward the roots of the front teeth where the upper part of the upper lip is sunken, as represented by this sketch (Fig. 8); but for moving the roots posteriorly, as needed in cases where the upper part of the lip is too prominent, they would not be practicable without some

modifications being made in them; these modifications can be made easily. This mechanism, like all the others that I have described, acts compensatingly, one force upon the anchorage being balanced by the others.

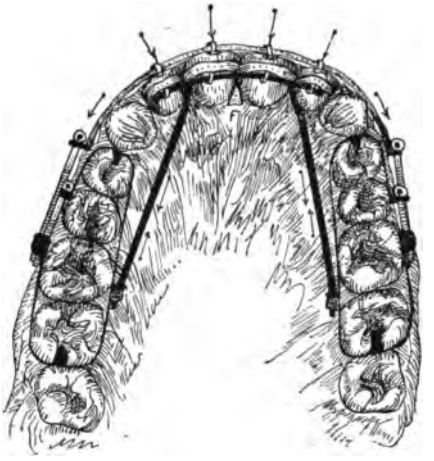


FIG. 9.
Mechanism for moving posteriorly the roots of upper incisors.

The following sketch (Fig. 9) represents a mechanism designed for this purpose. The crowns are stayed by an inside rectangular frame, resting in U-shaped lugs at the ends of the crowns, and braced against nuts soldered to the two anchor-clamp bands on the side

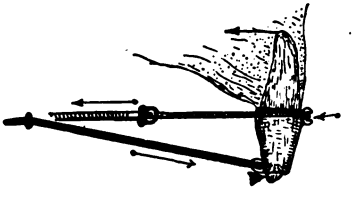


FIG. 10.
Showing the philosophy of the use of the brace and long band.

teeth; the roots are drawn back by what I call a screw-acting long band resting across the labial sides of the necks of the teeth to be acted upon and attached to the clamp bands by screws. (See Fig. 10.) This is a very slow operation.

DENTAL MEDICINE.

LACTIC ACID AS BONE SOLVENT.

DR. W. J. YOUNGER, SAN FRANCISCO.

Pacific Stomatological Gazette, November.

In speaking on this subject Dr. Younger says: Lactic acid has this superiority over sulphuric acid, that it does not act upon the soft tissues except to stimulate. He uses it not only when he wants to dissolve necrosed bone, but also as a solvent of tartar in pyorrhea. He found in that operation its effect upon the soft tissue is to stimulate granulations and reunite the gum tissue with the tooth.

A LOCAL ANESTHETIC.

Chloroform ..... 10 parts.
Ether ..... 15 parts.
Menthol ..... 1 part.

To be applied locally.

LOCAL ANESTHETIC.

DR. C. P. LENNOX, TORONTO, CAN.

Dominion Dental Journal, March.

Oil of cassia.
Carbolic acid ..... āā m iii.
Pure alcohol ..... ʒ i.

The above to be mixed before adding the other ingredients in order to cut the oil of cassia.

Then add—

Pond's extract ..... ʒ iv.
Pyrozone, 3 per cent. solution ..... ʒ iii.

The pyrozone must be fresh, so as to avoid any deterioration which might take place in it if allowed to stand open. It is better to make a quantity, because it seems to work better when a month old.

For extraction, inject well around the roots of the teeth. Wait for a minute, then extract. If you wish to get rid of a pulp for crowning or immediate filling, have a short needle; place upon it a piece of soft rubber, to act as a compress, leaving only the point exposed; place the point in the opening over the pulp and inject the solution into it. You can take the pulp out without the least pain.

LOCAL ANESTHETIC, FOR HYPODERMIC USE.

DR. W. A. LEGGO, OTTAWA, CANADA.

Dominion Dental Journal, September.

℞ Chloral hydrate ..... grs. xv.
Sulph. atropin ..... gr. ss.
Carbolic acid ..... gtts. viij.
Cocanni hydoch ..... grs. xi.
Boracic acid, saturated sol ..... ʒ j.
M. To above add water, boiled or distilled, ʒ j.

LOCAL ANESTHETIC.

Dental Digest, January.

℞ Chloral hydrate .....
Gum camphor ..... āā gr. lxxv.
Cocain hydrochlorate ..... gr. vi.
M. Triturate in a mortar until liquified.

Sig. Use as local anesthetic on the skin, mucous membrane, or hypodermically. This may be used after opening an abscess, in the socket after extracting a tooth—for removing pulp or portions of a pulp. Use it also in pyorrhea pockets before removing deposits. In odontalgia, any solution up to 20 per cent. cocain may be used.

APHTHOUS SORES.

Apply crystal resorcin. Handle carefully.

BALSAMO DEL DESERTO.

DR. W. H. WHITE, SILVER CITY, N. M.

International Dental Journal, October.

Last year the writer claimed much for this gum; now he comes forward with increased vigor and praise for it. It is an animal substance. Pulp-capping, cavity-lining, root-filling, mixing with amalgam for permanent fillings, he uses it for. He claims wonderful success in root-filling. The pulp is removed with a drill, the pulp ends of the roots are cleansed out with a drill, oil of cinnamon is applied, and the pulp cavity and portion of roots filled with the balsam. No attention is paid to the entire removal of nerve from roots.

OIL OF CASSIA AND TURPENTINE.

Dr. Gordon White speaks very favorably of this mixture as an antiseptic.

COCAINE SOLUTION.

DR. N. S. HOFF, ANN ARBOR, MICH.

Ohio Dental Journal, October.

Dr. Hoff has adopted the formula below as one the drugs of which harmonize therapeutically in producing a more powerful local anesthesia and one that causes systemic disturbances very rarely.

The solution is made daily, or as needed for use.

℞ Cocaine ..... gr. ½.
Sulphate of morphine ..... gr. ⅛.
Sulphate of atropine ..... gr. $\frac{1}{200}$.
Sterilized water ..... gtts. xxx.

Mix and inject hypoder. gtts. v to xv.

The cocaine, morphine and atropine are made into soluble tablets by Park, Davis & Co. In this way solutions of any strength desired may be quickly and accurately made with little or no inconvenience. The sterilized water is distilled water containing from 8 to 10 per cent. of listerine or euthymol to keep it sterile. If a 2 per cent. solution is desired all that is necessary is to dissolve one of the tablets in twenty-five minims of water. A 1 per cent. solution can be made by dissolving one tablet in twice this quantity of water, or 50 minims. A 4 per cent. solution can be made either by reducing the water one-half or adding another tablet to the 25 minims, etc., etc.

HYPODERMIC USE OF COCAINE.

H. B. HINMAN, U. OF M.

Dental Register, April.

One of the best formulæ which we have to-day for the administration of cocaine hypodermically, is that furnished us by Dr. Hoff, and is as follows:

℞ Cocaine hydrochlorate ..... ½ grain.
Morphine sulphate ..... ¼ grain.
Atropine sulphate ..... $\frac{1}{200}$ grain.
Distilled water ..... 25 m.

When compounded in these proportions, we have a full dose of a two-per-cent. solution, in which the morphine acts as a corrective to the cocaine, and the atropine serves the double purpose of being a corrective to both the cocaine and the morphine.

Cocaine preparations should be renewed at least every three or four days, and preferably every day, as, after being kept a short time, a mould forms in the solution, which so chemically changes the cocaine that it will cause sloughing of the gums.

Care should always be taken in the selection of the patient, as weak and nervous persons, and those having diseases of the heart and lungs, are particularly subject to the toxic effects of the drug; and it should be used very gradually, if at all, in these cases.

The time of day also has a marked bearing on the subject, as the patient bears the administration of the drug much better early

in the day, and after a hearty meal, than later on, when tired out and when several hours have elapsed since the taking of nourishment.

The toxic effects of cocaine are exhibited by an embarrassment of the respiration and circulation. Respiration becomes slow and shallow, and the pulse small, rapid, and intermittent, and after a time, if the toxic effects be sufficient, they may cease altogether.

Cocaine should never be administered without having the proper antidotes and resuscitants at hand for use in any emergency that may occur.

Ammonia and nitrate of amyl are both given by inhalation for the purpose of stimulating the respiration and the heart. Opium and chloral are also administered, but in extreme cases a hypodermic injection of aromatic spirits of ammonia or sulphate of strychnia, together with artificial respiration, are the most efficacious.

It is well, when the patient shows signs of nervousness, to administer a little brandy, or ten to fifteen drops of aromatic spirits of ammonia well diluted with water, a few minutes before the operation, thus allaying the nervousness and insuring a strong, steady pulse throughout the course of the drug's action.

There are many forms of the hypodermic syringe on the market to-day which are equally good—the two most important points in regard to their construction being that they are easy of manipulation and readily sterilized.

The points of the needles, as bought at the depots, are too sharp to work satisfactorily, as they are apt to become bent, and they are also troublesome, as they catch in the alveolar process very readily. It is always best to round them off somewhat on an oilstone before using.

The needle should be inserted a short distance from the neck of the tooth, and pressed slowly but firmly toward the apex of the root. After passing into the tissues for a short distance, a drop or two of the solution should be slowly injected, and the needle then pressed forward a little further and a small quantity more forced into the tissues in a similar manner.

The amount and rapidity of the injection should be governed by the density of the tissues, as those which are very dense will

take up less of the solution and require a smaller amount to anesthetize them than where they are more loosely arranged.

The needle should not be withdrawn for about a minute after the injection is made, and then the finger should be placed over the puncture for a short time, to prevent the exudation of the cocaine solution.

Care must also be taken not to inject into an abscess cavity, as the fluid will then escape into the mouth, and is apt to paralyze the muscles of the fauces and the other accessory muscles of respiration there.

If the needle penetrates one of these abscess cavities, it should be at once removed and inserted at another point.

Two injections of from two to five drops each, of a two-per-cent. solution, one on each side of the tooth, are usually sufficient to produce complete insensibility to the pain of the operation. Many of the cases of sloughing of the gums, attributed to cocaine, are due to septic material introduced by unclean forceps, and would have occurred had the cocaine not been used.

We cannot be too careful in attending to the proper sterilization of the needle, lancet, and forceps.

If the mouth be rinsed out freely with warm water for some minutes after the operation, it will tend to prolong the bleeding, and thus relieve the gorging of the blood-vessels caused by their relaxation, after the over-stimulation from the use of the drug.

When these precautions are taken and strong solutions are not used, the use of cocaine will seldom be accompanied by sloughing of the gums.

OBTUNDING SENSITIVE DENTINE.

DR. C. H. TAFT.

International Dental Journal, January.

In treating sensitiveness at the necks of teeth, Dr. Taft says: first wet the surface with alcohol, then dry thoroughly with hot air, and then touch the surface with caustic potash.

DENTINE OBTUNDENT.

A saturated solution of carbonate of potassium and glycerine is very highly recommended for allaying sensitiveness at necks of teeth. Also for obtunding pain in excavating cavities. A few minutes is time enough for the application.

DENTINE OBTUNDENT.

International Dental Journal, November.

Dr. R. R. Andrews mentions the use of glycerine and cocaine as an obtundent.

OBTUNDING SENSITIVE DENTINE.

DR. G. F. HARWOOD, WORCESTER, MASS.

Dental Cosmos, July.

Inclose teeth in dam, cleanse the surfaces and cavities with alcohol, varnish the teeth (except the cavity to be excavated) with sandarach to protect from the air, either hot or cold; dry the cavity with warm air, apply eugenol oil; this remaining a few moments is generally sufficient. In case of extreme sensitiveness wash out the eugenol oil and apply the "Robinson Remedy," or follow with chloroform and tinc. aconite root.

NITRATE OF SILVER AND ALCOHOL, FOR SENSITIVE DENTINE.

DR. H. D. BOYD.

Southern Dental Journal, August.

In applying nitrate of silver to allay sensitive dentine, if the crystals are moistened with alcohol, its effectiveness is greatly enhanced.

SENSITIVE DENTINE, OBTUNDING.

Dental Practitioner and Advertiser, July.

Dr. C. E. Francis, in preparing sensitive teeth for filling, uses a solution of bicarbonate of soda in electrozone. He saturates the cavity with this and then proceeds to excavate, renewing the application whenever necessary, and finds that it modifies the pain to a considerable extent.

MUSK DENTIFRICE.

British Journal Dental Science, December, 1894.

Camphorated chalk	2 ozs.
White castile soap	3 drms.
Powdered orris root	6 drms.
Bicarbonate soda	3 drms.
Grain musk	2 grs.

ELECTRICITY AS A THERAPEUTIC AGENT.

DR. G. L. SIMPSON, ALLEGHENY, PA.

Ohio Dental Journal, December.

Any metal parts coming in contact with the mucous membrane should be made of gold or platinum; any baser metal will often produce a very painful sore. As platinum is a very poor conductor of electricity, he made the contact parts of gold, but this should be covered with wet cotton or linetine. After an electrode has thus been prepared and connected with the wire leading to the zinc of the battery, it should be placed so as to send the current through the inflamed tissues, then the negative electrode, or cathode should be applied, preferably to the hand of the patient on the affected side. For when applied to the face or neck, as formerly recommended, it makes an objectionable temporary red spot, if not a small blister. If applied to the hand there will be need of more current, as the hand offers powerful resistance to the current, and especially the heavy epidermis of the hand. When the

electrodes have been thus applied, turn on the current gradually until the milliampère meter shows one, two, or three milliampères. According to the susceptibility of the patient, it is seldom necessary to use more than three milliampères, unless for a very few seconds, and then, perhaps, four or five at the most. Some patients complain of a tired feeling even with a very mild current; it is best then to give them a rest, or still more, reduce the current. He has had two or three patients that became faint, and had to discontinue the treatment, at least for some hours.

For the complete control of inflammation of the peridental membrane or abort an alveolar abscess, or kindred troubles, he has seldom found it necessary to resort to cataphoresis, or the introduction of drugs through the mucous membrane by the use of electricity, but the use of aconite or even iodine may sometimes be employed with happy results in this way.

A weak solution of cocaine may be thus used for minor operations, very successfully, but some care is advised in dealing with two such powerful weapons. For the relief of severe facial neuralgia, Frederick Peterson, M.D., says:

With an additional experience of twelve years in the frequent treatment of neuralgias of superficial nerves, with 10 to 20 per cent. solution of cocaine on the anode, I can only reiterate my conviction that it is the best means we have for the relief of such conditions.

Cocaine employed in this way does not cure neuralgias of peripheral origin. All that is claimed for it is, that it gives relief without producing constitutional effects, and is, therefore, superior to any narcotic given internally, and to any other local application.

First, when about to discontinue treatment, do not pull off the positive electrode. If any one, let it be the negative, but better still, slowly reduce the current, "and then form a good habit of removing the negative electrode first, and thus prevent the possibility of a shock.

PAIN AFTER EXTRACTION.

For severe pain after tooth extraction, Dr. J. D. Thomas says the application of hot water to the parts will relieve it immediately.

PAIN AFTER EXTRACTION.

Journal British Dental Association.

In reporting a case of twelve days' pain after extracting a tooth to relieve periostitis, Mr. Bennett says relief was finally and instantly obtained by passing a Paget's knife into the socket and cutting across the nerve.

FORMALIN FOR TREATING DISEASED PULPS AND ROOT CANALS.

DR. EARNEST SJOBERG, STOCKHOLM, S.

For the treatment of inflamed pulps, 1—5 % solution of formalin has given good results. This solution has astringent as well as antiseptic effects. If a 30 per cent. solution is applied to a pulp for twenty-four hours, the pulp presents a gray appearance, is hard and elastic, and can be removed easily. For disinfection of roots with gangrenous pulps, the same solution is used with success.

RESTORING GUM MARGINS WITH RESORCIN.

DR. R. H. COOL, SAN FRANCISCO.

Pacific Coast Dentist, February.

For restoring diseased and receded gum margins to health and position resorcin is exceedingly valuable. The teeth should be cleansed of all deposits by means of delicate scalers, etc.; and in the endeavor to restore the gum about the neck of the tooth a crescent-shaped incision should be made with a sharp lancet through the gum to the alveolar process, if it be present, and if not, to the root itself, near its border; to this apply the crystal resorcin. It is well to then pencil the margin with iodide of zinc, carried upon orange wood, for coagulation. The process of healing should not be disturbed for about three weeks, while the following mouth-wash is prescribed:

℞ Ol. cassia..... gtt. v.
Resorcin..... gr. xxx.
Alcohol..... ʒ. ij.
Aq. q. s..... ʒ. iv.

At the next sitting an incision upon each side of the former one should be made, care being taken to avoid the cicatrix that has been formed, and these filled with resorcin. Three weeks later another incision toward the root should be made and filled with the same agent, and as before, avoiding the cicatrized tissue already formed. This produces an adhesive inflammation, which is not destructive, and draws the separated parts together.

AID TO TREATING DISEASED GUMS.

DR. B. H. CATCHING, ATLANTA.

In treating diseased gums, whether simple or associated with pyorrhea alveolaris, it is very essential to success that all foreign matter be kept from the interdental spaces and around the necks of the teeth. The patient can do this well if provided with a prescription for a bulb syringe and an antiseptic mouth wash, and taught to use the syringe by filling it with the wash and placing the point between the teeth at the gums, inclining it up or down as required for the lower or upper teeth, and with firm pressure on the bulb forcing the wash in and around the teeth. Listerine is good.

DENTAL HEMORRHAGE.

DR. J. S. M'DONALD, DURANGO, MEXICO.

Dental Cosmos, December.

The writer recommends the use of two-drachm doses of the sulphate of soda or magnesia, every fifteen to thirty minutes, in concentrated solution internally, or from twenty to thirty drops of acid arom. sulf. in a little water, and iodoform, tannic acid, and tinct. benzoin as a local application, applied on a cotton plug, then slipping a small rubber band over the adjoining teeth,

crossing it. Before applying the rubber band, soften a piece of gutta-percha and form a splint over the cotton plug, the whole being held in place by the rubber band, which also will give an elastic pressure on the part and inconvenience the patient very little.

The soda sulf. he has found to arrest hemorrhage in from fifteen to thirty minutes; has used it in uterine and nasal hemorrhage with equally good results.

DENTAL HEMORRHAGE.

Some severe cases of dental hemorrhage have been arrested by pressing softened modeling compound around the parts and closing the jaws.

LYCOPERDON FOR DENTAL HEMORRHAGE.

DR. C. BREWSTER, MONTREAL, CANADA.

Ohio Dental Journal, June.

The writer, in speaking on this subject, says when lycoperdon is used for plugging the alveolus, the wound, instead of presenting an angry, irritated appearance and healing slowly, as is the case when the preparations of iron are used, or even tannin, shows every indication to heal by first intention, and not only that, but it shows a decided tendency to heal more rapidly than under ordinary circumstances.

He cites the fact that the greatest virtue lies in lycoperdon bovista. It is smaller and harder to obtain than the giganteum. By medicating the bovista with carbolic acid and camphor, certain objections are removed, and it is made antiseptic as well as styptic. The active principal of the lycoperdon is due to its phosphate of soda.

[The common name for this article is puff-ball. It is found in fields.—ED. COMPENDIUM.]

TREATMENT OF ALVEOLAR DENTAL HEMORRHAGE.

DR. OTTO ARNOLD, COLUMBUS, OHIO.

Dental Cosmos, October.

The majority of cases of hemophilia are traceable to heredity, although it may originate spontaneously. It is more common in males than females, the proportion being about twelve to one. A few claim to be able to recognize "bleeders," and describe them as fresh, healthy-looking persons, with fine, soft skin, through which the superficial veins show with marked distinctness. These are not, however, infallible signs, as the condition may exist and not be suspected until an uncontrollable hemorrhage follows some trivial injury. Structural weakness in the vessels, and deficiency in the coagulating element in the blood, are the conditions that seem to account most plausibly for this disease.

In statistics by Townsend, of fatal cases of hemorrhage from various trivial surgical operations, tooth-extraction is given as the cause of the greatest number. This may seem to many a startling statement; but it has never been successfully contradicted, and it should be a standing menace to the dentist, warning him against carelessness in his operations and narrowness in his professional attainments.

A condition or disease which may add the elements of danger to this common and much practiced operation, often calls for serious thought and prompt action on the part of the dentist. The writer is one of those who believes the dentist should be broad enough and thorough enough to successfully meet every emergency that may occur in his practice,—that is, so far as it may be within human possibilities.

Preliminary to considering the treatment for excessive alveolar dental hemorrhage, he cannot refrain from emphasizing in the strongest terms the necessity for great care in operations for extracting teeth; this in itself would prevent many troublesome hemorrhages that are too evidently the result of unnecessary lacerations.

Among the favorite agents for local use in persistent bleeding from external surfaces, Monsel's salt or persulfate of iron has been much lauded. He takes pleasure in the opportunity to condemn

it as the most unreliable and treacherous agent to be used for the purposes under consideration. The clot that is formed by the aid of this agent is quickly formed, but too frail in structure to withstand the vis a tergo of the blood-current; usually it soon breaks away, and secondary bleeding follows. Forcibly plugging the bleeding socket with wood, cotton, wax, etc., for the purpose of mechanically stopping the flow of blood is too violent a procedure, often doing more harm by expanding or distending the socket and its environment, thereby increasing the provocation.

The use of the actual cautery, likewise extensive surgical methods to the extent of exposing the larger vessels of supply for ligation, plugging foramina or canals in bones containing blood-vessels, are not, in his opinion, commendable methods at the present day. In short, he is opposed to the application of force in any form.

For obvious reasons, also, he cannot commend the use of compresses, bandaging, etc., until milder and more comfortable methods have been tried.

In his own experience (and he has given this subject no little thought and clinical attention, with most gratifying and positive results, indeed) the only satisfactory results have been attained by the employment of the simplest remedies applied in the gentlest manner.

As an astringent for local use, tannic acid, either in powder or saturated aqueous solution, for direct application to the bleeding parts, is the most efficient and safest of all agents known to the writer, and will not fail to accomplish its purpose in ordinary cases uncomplicated with constitutional tendencies or injury to the larger vessels.

A simple method of application is to introduce a quantity of dry tannin into the bleeding socket and follow with a pledget of dry cotton, gently placed, but filling the cavity snugly; the subsequent expansion of the cotton as it becomes moist securing its retention.

If the larger vessels have been ruptured it may be necessary to secure them for torsion or ligation. This would be no child's play; but the condition is rarely met with, at least the writer has never been obliged to resort to such measures, and from the testimony of others of longer and more extensive experience, he is warranted in the statement. If, however, arterial hemorrhage exists

and torsion or ligation is impracticable, he would recommend the application of a batter of plaster of paris, enveloping the parts as in the process of taking an impression, the hardened mass to be left in situ until all chances of a recurrence of the bleeding have passed away. To allay mental excitement and diminish the frequency of the pulse-beats, drachm doses of the fluid extract of ergot may be given at intervals of three hours.

Since positive or pathognomonic signs may be entirely absent in constitutional bleeders, it is not possible to be always forewarned; and unless the victim is aware of the tendency from previous experience, or suspects it from inheritance, there may be absolutely no data to govern the operator, and not until the patient, for whom we may have extracted one or more teeth, becomes alarmed at a prolonged and persistent hemorrhage is the case understood.

If, however, we have knowledge or suspect the existence of the hemorrhagic diathesis in a patient for whom it becomes necessary to extract a tooth, no plainer duty is evident than that every possible protective measure should be brought to bear upon the case to prevent, as far as possible, alarming or dangerous consequences.

His universal method of procedure in the management of patients following tooth-extraction is to have them rinse the mouth freely with hot water. This encourages free and uninterrupted bleeding from the wound and stimulates a normal reaction in the tissues, soon followed by a natural cessation of the hemorrhage. Since the adoption of hot water as mentioned, he has had less frequently to do with troublesome bleeding.

If any considerable amount of laceration has taken place, he attempts to replace the tissues by compressing with the fingers or stitching into apposition any pendent portion of the gum, prescribing as a dressing:

℞ Tannic acid ..... gr. xx
Listerine, ...
Aqua dest. ..... āā ℥ iv. M.
Sig.—Apply frequently to the wound.

If the patient is known to be a bleeder, or, in the absence of any evidence to that effect, if the bleeding be prolonged indefinitely, he should at the first opportunity prescribe gallic acid in ten-grain

doses, to be taken into the stomach every hour until the bleeding is arrested. A well-tried prescription is the following:

℞ Gallic acid ..... ʒ i.
Aqua cinnamon ..... ʒ iii. M.
Sig.—Tablespoonful every hour until hemorrhage ceases.

Gallic acid, as an internal astringent, possesses superior properties, and is free from the disadvantage of inducing constipation. It is easily assimilated and readily transported by the blood; therefore is peculiarly effective in all hemorrhages where the bleeding vessels are to be reached through the route of the circulation.

Tannic acid is converted into gallic acid in the stomach; therefore the dosage for a given result would have to be greater and the process slower; besides, constipation of the bowels would ensue. For direct application, however, to the bleeding part, tannic acid is the more efficient remedy.

Gallic acid, in addition to being an astringent, has the property, he is convinced, of increasing the coagulable properties in the blood, having observed the greater facility with which a clot is formed after the agent is administered.

He has never seen a case of alveolar dental hemorrhage that was not arrested after the taking of from one to three ten-grain doses of gallic acid. He considers it the most valuable agent known for the purpose in question.

Conjoined with either or all forms of treatment for the lesion in question, he strongly advocates rest for the body of the victim, the recumbent posture, with the head and shoulders considerably elevated, being preferred.

In conclusion, then, independent of surgical or mechanical means which might suggest themselves in given cases, he relies upon two agents, viz, gallic and tannic acids; the former for systemic, the latter for local effects.

ALVEOLAR DENTAL HEMORRHAGE TREATED.

Dental Cosmos, October.

Dr. T. W. Bropy, Chicago, says: In case of excessive hemorrhage from the socket of the tooth after its removal, if he could not

arrest it by simply dusting the surface with the subsulphate of iron, which he regards as the most potent of all local applications for the treatment of hemorrhage of this character, he should plug the cavity. Perhaps the best thing for this purpose is pink gutta-percha. He would make a soft plug, dusting the cavity well with the subsulfate of iron, and then thrusting the gutta-percha, while yet soft, down into the socket, and allowing it to extend far enough above so that it could be ligated from tooth to tooth, over the top of the gutta-percha, thus holding it firmly down in the socket; or, if the occasion seemed to require it, it could be allowed to stand up above the other tooth; then bringing the jaws together, the opposing tooth coming in contact with the gutta-percha, holding it down in place; and then, by adjusting a bandage, fixing the jaws so that they could not open. Pressure is always valuable in the treatment of hemorrhage, and in no place is it more valuable than in the arresting of hemorrhage resulting from the extraction of a tooth.

Dr. H. P. Snyder, Grand Rapids, Mich.: The writer's remedy for the arrest of hemorrhage is merely to first cleanse the mouth. He never removes the clot from the socket, but with a small pair of surgeon's scissors cuts off the top, if it extends into the mouth extensively; then applies a little cosmoline or vaseline to the fingers, places the patient in a reclining position, and applies a compress with the thumb and finger. The vaseline is to prevent the adhesion of the blood to the thumb and finger, so that they may be readily removed. If you arrest the hemorrhage for twenty-five minutes and allow the fibrin to form a solid plug in the socket, then, no matter in what position you place your patient afterward, the hemorrhage will not occur again. Remove the thumb and finger very carefully, without disturbing the clot. He has never had a recurrence of the hemorrhage after this treatment, which he considers the most simple, and perhaps the most valuable of all the methods he has used, having never had a failure in a great many cases of excessive hemorrhage.

Dr. W. H. Jackson, Ann Arbor, Mich., describes the case of a lady who nearly had sunstroke. There was a strong tendency of blood to the head, and her face was perfectly livid. He would stop that and it would stay fifteen minutes stopped, and then there would come an intense pain and the blood would spurt out three or four feet from the sockets. He would stop it with Monsel's solution

and it would do the same. Then he placed the feet of the patient in water so hot that it caused a counter-irritation and drew the blood from the head down to the feet. In fifteen minutes, from a livid face, a gentle moisture began to come out on the hands and face, and the appearance of the face became normal. The blood stopped of itself, and then there was no need of the styptics.

He says there may be scarcely any fibrin in the blood to coagulate. In such a case stimulation of the formation of fibrin is necessary. Many hemorrhages may be stopped by simply giving from one to two drachms of acetic acid, in the form of cider vinegar. He has seen a hemorrhage of the lungs stopped in five minutes simply by administering a couple of drachms of acetic acid, in the form of vinegar. Also you will find that tincture of hamamelis is good to administer in those cases. So long as there is not a tendency of blood to the head, anything that will form a clot will stop the hemorrhage; but when there is that tendency you may form a clot and it will burst away. Then hot water on the feet is very good.

FOR DENTAL HEMORRHAGE.

Dental Cosmos.

Dr. C. R. Yearick, Detroit, Mich., says tincture of gum benzoin is his best remedy for dental hemorrhage. He uses it with tannin. First prepare a pledget of cotton, dip it into tincture of gum benzoin, and then into tannin. Place it in the socket from which the tooth has been extracted, and you will have no return of the hemorrhage. It is not poisonous, and you may use it also for other hemorrhages on your hand or elsewhere.

DENTAL HEMORRHAGE.

Sometimes the use of turpentine will be found valuable. Saturate a piece of cotton and plug the cavity with it.

GLYCERO-TANNIN FOR HEMORRHAGE.

Pacific Coast Dentist, February.

Dr. F. C. Pague recites an alarming case of dental hemorrhage which, after many efforts and remedies, yielded to glycerine and tannin. Four parts tannin, one part glycerine.

TREATMENT OF HEMORRHAGE BY ELECTRICITY.

DR. M. G. JENISON, MINNEAPOLIS.

Ohio Dental Journal, November.

Apply the positive pole directly to the wound, having the metal point of such shape that it will come in contact with as much of the injured surface as possible. Then turn on current gradually until thorough coagulation, but not cauterization, is produced. By this means, perfect relief has been given in cases where no effect whatever was produced by the usual remedies, including compressing.

IODINE AND CREOSOTE.

This is an old remedy for alveolar abscess, and it yet holds good. Use equal quantities of beechwood creosote and iodine.

SOME POINTS ON SOLUTION OF IODINE.

DR. W. V. B. AMES, CHICAGO, ILL.

Dental Review, April.

The long-felt need of ideal antiseptic dressings for the root canals of pulpless teeth under different conditions led him to make, during the past year, some experiments with the permanent and manageable solutions of iodine, because of the satisfactory results of a considerable use of iodine as liberated from a solution of iodide of potassium by electrolysis as a remedy in pyorrhea pockets.

Iodine is soluble to some extent in all volatile oils and most other fluid hydrocarbons. The ideal solvent seems to be terebene or other terpenes, having the composition $C_{10}H_{16}$. Terebene will dissolve twice its own weight of iodine and yet have a decidedly fluid consistency. The solubility of iodine is peculiarly affected by the presence of tannin, which fact immediately suggests its use in connection with the solution of tannin in glycerin, much used as an application to recently devitalized pulps. While plain glycerin will dissolve only about one grain to the drachm, if tannin be added in proper quantity at least ten times that quantity will be readily taken up.

The use of solutions of iodine in such agents as creosote, carbolic acid, and campho-phenique are precluded by their objectionable odor. The most valuable solution of iodine resulting from his experiments has been that in oil of cassia. Pure cassia with iodine dissolved to the extent of two grains to the drachm by weight will make a syrupy solution, which seems to be a new compound, differing radically from its components, being less irritant than either of the constituents. Its syrupy nature renders it easy of application to pulp canals. It is only slightly soluble in water, and yet such solution gives all appearances of being a potent germicide and antiseptic. From use of this combination he feels more confidence, depending upon it as a dressing to be sealed up for months, or possibly permanently, than any dressing previously used. If pure cassia is used, the mixture will become in time quite hard, so that it is necessary to make a fresh solution from time to time. This hardening or stiffening answers a useful purpose oftentimes when used as a dressing or pulp chamber filling, as it becomes in that state almost insoluble. For the temporary setting of crowns, a solution that has become quite stiff can be used as so much cement or gutta-percha, softening it somewhat, if necessary, by immersing in hot water the bottle or jar in which it is contained, the material stiffening again when cold. If a crown fits a root accurately, it is held most satisfactorily with this antiseptic glue. He has taken them off after being worn for several weeks, set with this, finding a thoroughly aseptic condition within. For this temporary setting of crowns it is a great success when used of the proper consistency.

If it is desired to overcome the tendency to become hard in this mixture of cassia and iodine, a trace of terebene can be relied

upon for this purpose. In the solution of two grains of iodine in a drachm of cassia, 1 or 2 per cent. of terebene is sufficient, or, by using a little more terebene, it is practicable to dissolve more iodine, obtaining probably a more potent mixture and the same syrupy consistency. For instance, the following parts by weight might be used:

Pure oil cassia ..... 1 3.
Terebene ..... 5 gr.
Iodine ..... 5 gr.

By incorporating a sufficient quantity of a suitable insoluble mineral or metallic oxide with the cassia and iodine solution, a mixture similar to iodoform paste is obtained without the same disagreeable features.

It is extremely essential that the oil of cassia be pure. Many samples contain a sufficient proportion of other oils, especially that of cloves, to render the solutions of iodine unsatisfactory. The oil of Ceylon cinnamon is not as satisfactory for this purpose as the oil of cassia.

MYRTOL FOR PUTRESCENT ROOT CANALS.

Dental Review, December.

Dr. Harlan has discarded the use of cassia in the treatment of the roots of front teeth on account of its staining properties, and now uses myrtol.

NECROSIS OF ALVEOLI AND MAXILLÆ, CAUSED BY ALVEOLAR ABSCESS.

Dental Cosmos, July.

Dr. Wm. A. Mills, Baltimore, reports an interesting case of a lady, aged thirty; of nervo-bilious temperament; called for advice concerning a fistulous opening situated at the right side of the superior central incisor, from which was discharging freely a dark-colored pus. Upon examination it was found that the right central, lateral, and cuspid were dead. The patient stated that they had been so for seven years or more, and had never been treated. The

case was diagnosed as necrosis, superinduced by chronic abscesses. The following was prescribed:

℞ Acid. sulphuric. aromatic. . . . . ℥ ij.
Aqua . . . . . f℥ x. M.

To be injected by the patient into the fistulous opening five or six times daily, bicarbonate soda and water to be used as an alkaline mouth-wash after each injection. Patient was instructed to report every other day for examination.

At the expiration of two weeks all discharge had ceased. The soft tissues had fallen into the cavity made by the action of the aromatic sulphuric acid upon the necrosed tissue. An incision was made, extending from the fistulous opening to the right first bicuspid. The cavity was then packed with absorbent cotton saturated with the following:

℞ Acid. carbolic, c. p. . . . . .
Tinct. iodin. . . . . āā ℥ ss.
Aqua . . . . . f℥ xij.

The patient was then dismissed, to return next day, when the cotton pledget was removed. The soft tissues having been pushed aside, he was able to see to what extent the bony structures had been diseased.

Found the line of necrosis had involved the right facial surface of the superior maxilla from the left central to the right bicuspid, and upward from the alveolar ridge to the anterior nasal spine, a part of which, with the bony structure around the apices of the dead teeth, had been destroyed. Only sufficient alveolar septum remained to hold them in position. [A similar case is reported by Dr. Black in Vol. I., page 950, "American System of Dentistry."]

He opened the pulp-canals of the three dead teeth, cleaned, disinfected, and filled them at once. The filling-material was forced through the apical foramina from the posterior surface and dressed in the usual manner. The patient was then dismissed, with instructions to syringe out the cavity twice a day with the carbolic acid and iodine wash as long as the syringe could be used. Afterward the medicament was to be used as a mouth-wash.

In five weeks new bone-tissue had filled the void, and no evidence of the part having been diseased remained, the outline being quite perfect and all the tissues in a normal condition.

NERVE PASTE.

Dental Review, February.

Dr. A. G. Johnson recommends the following very highly:

℞ Arsenious acid.....gr. xx.
Hydrochlorate of cocaine.....gr. xxv.
Lanolin q. s. ft. paste.

Keep this preparation in a large open-mouth vessel.

NERVE PASTE OF BELLADONNA AND ARSENIC.

Dominion Dental Journal.

Dr. Diack considers morphia in a nerve paste ineffective, likewise tannin, aristol, iodoform, cocaine, or oil of cloves. He adds belladonna ext. to the arsenious acid, two parts of the former to one of the latter, and mixes them into a paste with glycerin. Belladonna acts on the sensitive nerves, and no pain follows the application of the paste.

ACUTE PERICEMENTITIS.

The pain from acute pericementitis can often be quickly relieved by a hypodermic injection of morphine in the gum near the affected tooth. One-eighth grain is sufficient usually.

PERICEMENTITIS—TREATMENT.

DR. E. H. RAFFENSPERGER, MARION, OHIO.

Ohio Dental Journal, November.

A very good remedy to abort an abscess will be found in the following formula, used freely several times a day on the gum surrounding the offending tooth, particularly during the first stages:

℞ Tr. iodine..... ℥ j.
Tr. aconite,
Tr. capsicum,
Chloroform.....āā gtts. x
M. Sig.—Apply to gums with camel's hair brush.

If the abscess is far advanced, and it is desired to hasten the formation of pus, or, as the saying is, to "bring it to a head," ¼ gr. calcium sulfide every two hours, given internally, together with the usual local remedies, will help matters wonderfully and save the patient much extra suffering.

PERMANGANATE OF POTASH AND PEROXIDE OF HYDROGEN.

DR. D. W. BARKER, NEW YORK.

International Dental Journal, January.

By the combination of these two agents in putrescent root-canals violent effervescence ensues. The best way to use them, the writer says, is to dip a Donaldson bristle in the powdered potash, pass it into the canal, then drop from a syringe a drop of peroxide hydrogen; work the broach back and forth in the canal as the effervescence continues. The writer says he has had no pericemental trouble by passage through apex of root.

TREATMENT OF PUTRESCENT PULP CANALS AND RESULTING LESIONS.

DR. J. D. HODGEN, SAN FRANCISCO.

Pacific Coast Dentist, May.

The art of successfully diagnosing or discriminating between different diseases and distinguishing them by their characteristic signs and symptoms requires a sound judgment guided by true observation, experience, and scientific knowledge. It is preëminently the most important and necessary accomplishment of a scientific practitioner. It is the fundamental structure upon which all subsequent work is to be done.

Sequentially the question follows: What are the conditions, characteristic signs, and symptoms observed in troubles associated with absence or death of the dental pulp? For convenience of study and interpretation of the writer's views, the question is answered:

First. A dead pulp in a partially putrescent state, having an unobstructed communication with the external air, or the desiccated tanned, or preserved condition known as the mummified pulp, with either external communication or hermetic encasement.

Second. A dead pulp associated with an acute inflammatory condition of the pericemental membrane, with or without an acute alveolar abscess.

Third. A dead pulp resulting in a chronic inflammatory condition of the pericemental membrane, with a chronic alveolar abscess.

Fourth. A dead pulp resulting in an alveolar abscess, from which there is a fistulous tract opening upon either wall of the alveolus and penetrating the soft tissue enveloping it.

In the first case, to the writer's mind, we have the most difficult of all to contend with; at least it has been found so in his personal experience, and yet it presents the most hopeful characteristics. The patient has, in the majority of cases, suffered no inconvenience, and many times is not aware of any trouble in that organ. This very fact alone is a serious matter to the operator, because there is every likelihood of his causing the initial disturbance, and so serious is this liable to be that it is with only the establishment of the greatest confidence that the patient will permit a continuance of the treatment.

It is clear to the observing mind that the absence of any inflammatory trouble makes cleanliness and thorough antisepsis all that is necessary preparatory to the final filling of the canal. It is also apparent that the intrusion of any instrument beyond the apical foramen is, under such circumstances, a most serious and unpardonable error.

After adjusting the rubber the first step is a careful removal of all the débris possible by thorough irrigation of the cavity and canals with a tepid one or two per cent. solution of carbolic acid in water, the solution to be forced in and withdrawn by the same syringe. After drying with cotton and linens we have the canals in question containing the decomposed products of albumin water, the salts common to the blood, and other incidental compounds of no particular importance. To the decomposed albumin our attention is particularly directed, for it is in it that putrescence and decomposition principally take place, resulting largely in fats and fatty acids.

Of these latter, palmitic is especially active, and it, with the glycerin, forms a compound occurring naturally and abundantly in human fat, notably tripalmitin. Such being the case, nothing presents a more particular usefulness, nor is more scientifically indicated than a strong solution of the dioxide of sodium. With this agent a saponaceous compound and glycerin is formed on the one hand, and on the other, by free and active oxygen uniting with the noxious compounds remaining, such as carboretted and sulphuretted hydrogen, we have harmless gases in their stead; not only this but the active bleaching and antiseptic properties of oxygen establish a condition of purity and cleanliness that cannot be improved upon.

The characteristic smell of soap is now very striking, demonstrating the reaction; gases are being evolved from the solution in the cavity and we have nature actively engaged in cleansing this miniature Augean stable. The operator may assist by broaching the canals with a stiff barbed broach, removing the clinging tissue from the sides of the canal, and the tubuli with it; all of which is taken up in the reaction. After several alternate washings with the tepid carbolized and the dioxide solutions the canals will present a perfectly clean condition, and should be thoroughly dried with the hot-air blast and absolute alcohol, and then a few shreds of cotton, moistened with Dr. Black's one-two-three, carried to the apex to act as an antiseptic dressing, the cavity filled with gutta-percha, and all to remain until the subsequent sitting, when all that is necessary is to remove the shreds of cotton and wash the canals with a strong solution of carbolic acid and water, dry perfectly and fill. At both sittings the gum tissue over the teeth next the affected one is cautiously painted with an equal part of the tincture of aconite and iodine.

The treatment of cases presenting symptoms indicating the second variety differs in few respects from the management just recounted, except instead of dressing the cleansed and dried canals with an antiseptic, it has been the writer's plan to have them as dry and clear of any substance as possible, sealing the crown cavity hermetically. The purpose of such treatment is to attract by the property of capillarity any pus that may be present in the apical space. The gum near the affected tooth should be painted with a rubefacient, and if considerable pain accompanies the manifestation the patient may be directed to take a cathartic at bedtime. At next

visit the canals should be washed with an antiseptic, dried, and then thoroughly treated with the dioxide of hydrogen—the writer prefers the preparation hydrozone (Marchand's). The hydrozone should be used until no effervescence is noticeable, alternating the washings with a warm five-per-cent. solution of carbolic acid. When this has been done the canals should be wiped and dried with a hot blast and absolute alcohol as before, and then dressed antiseptically. If no disturbance has taken place in the interim, and no indication of pus is observed at the next sitting, the canals may be filled.

In the third class, as in previous cases, the great aim is, first, perfect cleanliness, and that is well accomplished, as before, through the use of a mild carbolic and dioxide of sodium solutions. If the canals are particularly purulent after washing out the débris, the writer is in the habit of placing a small quantity of the powdered dioxide of sodium in the cavity and adding a drop of water, working this down into the body of the putrescent pulp or about a third the way of the canals. The cleansing is very effective; the solution may be used afterward. Care should be maintained in cleansing the canals—especially with substances which cause an effervescence—not to pass through the apical foramen. After they are cleansed and dried an antiseptic solution may be broached through the foramen, if found free, into the blind abscess. Hydrozone or a 15-per-cent solution of the dioxide of sodium may be driven into the abscess sac. After drying the canals the washings with the dioxide solutions should be continued, alternating with the carbolized solution, and drying until no further indication of the presence of pus is manifest. The canals should then be finally dried and dressed antiseptically. The same should be followed at the subsequent sittings until the abscess sac is entirely evacuated of purulent matter and no indications of sepsis are noticeable. The soft tissues are again, as before, treated to a rubefacient.

In cases of the fourth class—of putrescent pulp-canals, accompanied by a chronic alveolar abscess having a fistulous opening—the same general preliminary washing and drying is indicated. All soft and infected dentine should be removed from the cavity, and, above all, free access secured to the pulp-chamber and canals. When the canals are thoroughly dried an antiseptic should be driven by the syringe through each, if possible, into the abscess and out the fistulous tract; if any obstruction to this procedure is met with

cautious broaching will usually remove it; if the canal should still remain impassable, which is exceptional, the sulphuric acid treatment will effect an outlet. After the canals, abscess, and fistulous tract have been irrigated several times and the septic matter thoroughly removed, the canals perfectly dehydrated by the use of absolute alcohol and hot air, the writer is in the habit of generously moistening the canals with the oil of cassia and then with a hot-air blast volatilizing the oil and forcing it into the tooth-structure; the canal is then wiped dry and is ready for filling.

If, however, there is any reason to suspect a partial denudation of the end of the root occasioned by the process of suppuration or carious bone surrounding the root, it is best to defer filling for at least a week, dressing the canal antiseptically only and sealing the cavity. Some symptom will by the time of the next sitting make manifest any such complication, and the operator may proceed to amputate a denuded root-apex, or greater portion if necessary, dissolve carious bone or assist nature in separating the sequestrum from the living tissue.

If carious bone is suspected, one of two distinct methods of treatment may be selected, or the two may be combined. The fistulous opening should be enlarged, and as much of the carious structure chiseled and scraped away as possible, and the cavity then washed out with some substance which has the power of dissolving the carious portion remaining. Aromatic sulphuric acid has long been the accepted remedy for such conditions, as it also stimulates the parts to a healthy action favoring granulation. Dr. W. J. Younger is very emphatic in his recommendation of lactic acid for this purpose, claiming it to be a solvent of the lime salts forming the lactate of lime. Sulphuric acid is exceedingly unpleasant to the patient and disagreeable to the operator, and we hail with no little pleasure something which is more agreeable to take its place.

The forming and removal of sequestra may be assisted by solution. As soon as the roots are found to be in a healthy condition, i. e., when the pericementum has returned to its normal condition, the canals may be filled, leaving the carious tract for further treatment, which is dependent entirely upon the removal of the carious or necrotic tissue; when that is removed the cavity formed must be induced to fill with granulations from its depth outward. This is best accomplished by packing lightly with an antiseptic

gauze, or a wax or paraffin plug from the inner end of which a small amount is cut off as the cavity fills.

The management thus far outlined will, in the writer's opinion, insure the cure of the usual case. There are, of course, more complicated and serious difficulties occasioned from the death of a pulp, such as lesions of the antrum of Highmore, neuralgia, nasal catarrh, extensive caries and necrosis, resulting in deformity and sometimes fatally, the description and treatment of which would fill a huge tome.

It is the writer's belief that cleanliness is the first and greatest desideratum; that this is unquestionably best secured by the use of sodium dioxide, which combines the mechanical and chemical effect of the dioxide of hydrogen with the chemical virtue of kalium-natrium without the excessive effervescence of the former, and the disagreeableness and tedium of the use of the latter. Further, it is an active bleaching agent and germicide.

Drying and dehydration is next of importance. This process evacuates thoroughly the canal and to the greatest extent the dental tubuli, and with warm air lends a greater assistance to capillarity, by which property the structure is saturated with any desired antiseptic.

By the use of the hot-air syringe the writer has driven the vapor of several essential oils from the pulp-canals of a dehydrated tooth through the tooth-structure to the plaster of paris investing the tooth, showing perfect saturation. Recognizing the irritating property of the oil of cassia in excessive use, no attempt should be made to go so far with teeth in the mouth.

TREATING PUTRESCENT ROOT CANALS.

DR. J. W. WASSALL, CHICAGO.

Dental Review, September.

The writer's practice, when a pulpless tooth presents without a fistula, is as follows: Apply the rubber dam, open the pulp chamber thoroughly, cleanse out with pyrozone, place in the pulp chamber a pledget of cotton saturated with myrtol, close the cavity with oxyphosphate cement, being sure to make a tiny perforation for the egress of gas. Note that the canals or their contents are

not in any manner interfered with at this the first dressing. At the next dressing, which may be one or two days after, the canals should be cleansed and the dressing extended into them. This avoids the danger of forcing septic matter through the canals at the first treatment. These treatments should be continued at intervals of four days until the dressing is found to be free from stain or taint, when the canal may be filled.

PUS POCKETS.

Stomatological Gazette, November.

A very useful combination for pus pockets is this:

℞ Alumnol ..... gr. xxx.
Resorcin ..... gr. xxiv.
Oil cassia ..... min v.
Distilled water ..... ʒ. ij.

This will make an emulsion. It can be injected into the pockets direct, or be diluted and used as a mouth-wash. It is very pleasant to the taste.

PYORRHEA ALVEOLARIS.

DR. J. E. CRAVENS, INDIANAPOLIS, IND.

International Dental Journal, October.

The writer believes in the local cause of the disease. The symptoms he divides into constant and inconstant.

CONSTANT SYMPTOMS.

Pus always is present in untreated pockets, but cannot always be demonstrated at once because of protecting bone, which prevents pressure of a finger effectively.

The mucous membrane overlying a pocket is glazed, the gum hard and thickened, the color being modified from red to a violet, particularly that of the festoons.

The health line dips towards the affected sockets, just in proportion as health is restored in the parts.

In cases of long standing and numerous pockets, there is report of feverish discomfort of gums at almost all hours; disagree-

able taste emanating about the affected teeth, particularly on awakening inthe morning, frequent lassitude, impaired digestion.

These symptoms are not always constant.

INCONSTANT SYMPTOMS.

Frequent lancinating pains in affected sockets; sometimes regional neuralgia.

Slow recession of gum on labial and lingual aspects; a secondary growth of violet-tinted tissue from basis of shrunken festoons, between the teeth, rather indicating an early stage of disease.

Distressing night pains when abed, sometimes described by the sufferer as a drawing sensation in the pockets; relief is obtained only by sitting up; this symptom indicates profound and long standing pockets.

The teeth become elongated, loose, pushed out of the arch, or rotated in position with soreness; the last item indicating congestion of pericementum or periosteum, or both, where there is still attachment that has not been disturbed by the pocketing.

Sallow skin, hollow orbits, languor, indigestion, livid lips, ropy saliva, breath smells of pus.

One must not expect to find all these symptoms at once. I have discovered extensive establishment of pyorrhea alveolaris where nearly all the usual symptoms were wanting.

DIAGNOSIS.

The diagnosis, of course, is based upon the known symptoms. The observations of the patient should first be ascertained, and the extent to which they comport with stated symptoms should be noted; such information may guide the dentist where usual indications are obscure.

Observe closely for gingival inflammation and sponginess of gum and characteristic violet modification from red, particularly of festoons.

Apply firm pressure with a finger or other means upon the gum at cervix and bases of festoons, and watch for possible expression of pus.

Test all gingival borders with a thin, flat probe, for in many cases the pockets are concealed.

Interrogate as to gastric disturbance due to ingested pus, weakness, lassitude, facial neuralgia, bad taste, etc.

TREATMENT.

The object of treatment should be to cure. The first step to that end is to thoroughly cleanse the mouth. Remove all visible (salivary) calculus and polish off ordinary stains. All cavities of decay should be put in good sanitary condition and temporarily stopped with gutta-percha, to remain so until after the treatment shall be completed.

Having located a pocket and determined its extent and form, select a suitable instrument and proceed to remove whatever of calculus may be attached to the root within the pocket. But the operation should invariably be preceded by certain preparatory measures, such as thoroughly douching the pocket with water of 140° F., which should be projected into the opening with considerable force. The forcible current and the high temperature of the water will effectually displace all pus as well as any loose débris from the pocket, and the pounding effect of the hot fluid will stimulate receptivity of soft tissues, enlarge capillaries, and permit relief of congestion; this use of hot water immediately causes a whitening of the congested gum, and the patient is apt to report a sense of relief; the promotion of receptivity is advantageously demonstrated by the rapid and almost complete obtundation by cocaine, without hypodermic injection; it is seldom that a patient will submit to a second surgical sitting unless there has been local anesthesia, and the dentist cannot be excused for failure to at least try to mitigate pain. In most cases the operation may be rendered almost if not quite painless.

Remember that there is not the slightest danger of overdoing the hot water treatment as a preliminary, an intermediate, and even a final measure.

The choice and care of syringes is an important factor in treating pyorrhea alveolaris; most pockets are impenetrable by the nozzle that comes with the ordinary dental syringes, and often it is necessary that the point of the nozzle shall reach the ultimate depth in order to discharge cocaine at the place of greatest sensibility.

Remember that water scalds at 150° F., that 140° F. is as effective as 150°, and absolutely safe.

After or during removal of the pyonal calculus from a root, I lacerate the mass of new granulation tissue freely, even bringing away patches and shreds of it, together with portions of loosened

and folded pericementum that I may discover at or near the apex; the object of this laceration, etc., is to force a change from chronic and destructive form of periostitis, to the acute and bone-making character that is essential to a cure of the disease and obliteration of the pockets.

LOCAL OBTUNDATION.

Owing to the present limited knowledge of local obtundents, cocaine promises better for this purpose than anything else, but requires extended application to produce desired results. Experience has led me to adopt two solutions, one in water, the other in chloroform. Both solutions should be saturated. A poor article of chloroform will dissolve more of the alkaloid than the best, and I am not sure but it makes the more effective preparation. A saturated solution of cocaine in pure water amounts to about two hundred per cent., while a saturation in best chloroform attains eight per cent. with difficulty. The water solution probably is a dangerous preparation to handle in the mouth, and much caution should be practiced with it. My method is to not use more than a single drop at a time if possible, and take precaution that it does not escape about the mouth. This cannot be prevented always, but to guard against harmful effects there may always be at hand a supply of brandy or whisky with which to lave the mucous membrane of the mouth. The local relief from cocaine is usually prompt and complete from such means, but the stimulant must be held in the mouth until the benumbed parts begin to feel a sense of burning from the alcohol. I presume that a diluted preparation of alcohol of any other flavor would answer this purpose; in fact, I often employ a druggist's bay rum that is merely a highly flavored preparation of alcohol of fifty-five per cent. strength. The advantage of brandy or whisky over other forms of alcohol is that it may be swallowed after laving the mouth sufficiently, thus forestalling unfavorable effects upon the brain which patients are liable to experience after leaving the office of the dentist.

After the surgical procedure, follow immediately with a solution of sulphuric acid, made of one part commercial acid to ten parts of water, the common battery solution. Guard the parts to prevent ingress of saliva until there has occurred a blackening of clotted blood about the orifice of the pocket; then dry the clots

with cotton and protect with a sort of antiseptic varnish called stérésol, made as follows:

℞ Shellac ..... ℥ ix.
Benzoin ..... ʒ iiss.
Balsam tolu ..... ʒ iiss.
Carbolic acid-crystal ..... ℥ iij.
Oil cinnamon ..... ʒ iss.
Saccharin ..... ʒ iss.
Alcohol q. s. ad ..... O ij.

Digest several days and decant or strain.

This must be flowed over the surface of clot and adjacent membrane and evaporated for a minute or two. This stérésol is a tenacious dressing for operations in the mouth, and will hold safely for several days if undisturbed by brush or pick.

SECONDARY TREATMENT.

After about five days following a surgical sitting, a patient should return for a secondary treatment, which should consist in—first, washing the parts with water, heated as before to 140° F.; second, increasing the temperature to near 150° F. and continue washing; if any portion of a pocket remains open, it should be douched out as at first with a forcible current; but the operator should be careful not to disturb any granular tissue with the end of the nozzle of the syringe. There is much benefit to be obtained from following this secondary douching with a ten per cent. solution of nitrate of silver. This completes the secondary treatment.

Immediately upon a case of this disease coming under my care, a discontinuance of alkaline substances in the shape of dentifrices, soap, or medicines is required, because they encourage precipitation of the salts of common tartar in the mouth, and thus place the treatment at disadvantage. Also recommend frequent rinsing of the mouth with diluted bromo-chloralum, which is very cleansing and a powerful astringent; it is a valuable auxiliary; and advise the use of pulverized sulphur as a dentifrice, which is wonderfully effective for polishing the teeth, but usually its flavor and dryness render it not very seductive. The sulphur may be discontinued after completion of treatment, but the bromo-chloralum should be continued for several months, but in greater dilution; it is very sour.

EXTRACTING AND REPLANTING TO CURE PYORRHEA ALVEOLARIS.

DR. C. H. HARDY, SUMMIT, N. J.

Dental Cosmos, July.

When he has failed to cure all of the teeth after treating with such remedies as one has at hand, he extracts the remaining ones, if there is but a limited number, removes the tartar and replants them—securely binding them in with silk floss—dismissing the patient until such time as it is necessary to see him again. He takes a hypodermic syringe and a three-per-cent. solution of pyrozone and carefully syringes the socket out. This may be repeated several times if necessary. For this purpose a hypodermic needle, with the point broken off and the end ground smooth, should be used.

After the tooth has been extracted he thoroughly syringes out the cavity with a three-per-cent. solution of pyrozone. In about a week the tooth will usually get firm enough to allow the removal of the binding cords, and in the course of two or three weeks one will find that a tooth treated in this way will become much firmer than before extraction, and the exudation of pus entirely stopped.

PYORRHEA ALVEOLARIS, TREATMENT.

DR. A. V. ELLIOTT, FLORENCE, ITALY.

Dental Digest, February.

The first and most important essential is scaling to remove all foreign adhesions, then a thorough washing out of the pockets and around the roots with peroxide of hydrogen—sometimes adding a little of the 1000 solution of the bichloride of mercury. After a little rest and rinsing out the mouth, the next application should be of the nature of a stimulant—nothing better than a one-in-ten solution of sulphuric acid with a few drops of the tincture of iodine added. This can be injected into the pockets under the free margin of the gums with a Donaldson bristle, having a few shreds of cotton wrapped about it. This treatment might be changed sometimes, and Robinson's remedy or something else substituted. The patient, on leaving after the first visit, should be in-

structed in the manner of using his brush, and as to the kind of brush. A prescription for a disinfecting mouth-wash should be given him. A good one is Professor Miller's saccharin mixture, which should be used diluted. A formula for a simple and medicated tooth-powder should also be given, such as prepared chalk, orris root and chlorate of potash in equal parts. Besides which he must be instructed to rub the gums about the roots with the fingers, especially up and down, a sort of massage exercise, strengthening the gums and tending to press out foreign matter from the pockets. And finally he should be encouraged to exercise the loose teeth as much as possible by chewing on them freely and persistently.

SULPHURIC ACID FOR PYORRHEA ALVEOLARIS.

Dr. A. C. Hugenschmidt says for years he has swabbed out the pockets of pyorrhea cases with pure sulphuric acid. The roots having been thoroughly cleansed of deposits, a few shreds of cotton are wrapped around a broach, dipped into the acid and carried to the bottom of the pockets. This is usually applied twice, letting three days intervene. Immediately after the application the mouth is rinsed with bicarbonate soda water. In addition to this treatment, the gums are to be rubbed several times a day briskly with the finger.

PYORRHEA ALVEOLARIS, TREATMENT.

DR. GARRETT NEWKIRK, CHICAGO.

Pacific Coast Dentist, June.

The treatment of the writer for this disease is summed up as follows:

Thoroughly cleanse all the teeth at not less than two sittings, and find all the ulcerated points and make record of same.

Explore each pocket thoroughly, removing doubtful portions of the alveolar process, and of course all deposits from the roots of the teeth.

Cleanse pockets by repeated injections of H_2O_2 or 3 per cent. pyrozone.

Look to the occlusion, and to support if necessary.

Inject a rather weak solution of one of the essential oils--preferably, as a rule, cinnamon or cassia; often to this may be added with advantage a few drops of tincture of iodine. Sometimes apply silver nitrate to gums; sometimes inject weak solution of same; occasionally, where band of tissue closes drainage, cut or stretch and pack with lintine and iodoform and clove oil paste.

If at subsequent examination gentle use of probe shows cavity smaller, not so deep, little or no pus, bleeding easily, indications are of new granulations and favorable. Continue treatment on same lines, antiseptic but mild, as nearly as may be non-irritating. Do not over-medicate but insure surgical cleanliness.

From first to last seek to impress on the patient cleanliness and care for his own case, and see that he has the proper means.

At first, for some weeks perhaps, see the patient three times each week. Get control and keep it of the local conditions. Then twice, then once each week, then each month; keep watch; be sure the last lurking germ has been destroyed, and then watch against the possible invasion of more. Eternal vigilance on the part of both surgeon and patient is the price of safety in these cases.

PYORRHEA ALVEOLARIS, TREATMENT.

DR. W. XAVIER SUDDUTH.

Dental Cosmos, February.

In treating pyorrhea alveolaris, it must be remembered that in the simpler forms of the disease we only have to deal with an acute catarrhal process that is easily amenable to palliative medication combined with such mechanical handling as the case may seem to indicate.

Care should be observed in the removal of any local cause of irritation, such as salivary calculus, broken-down teeth and diseased roots, to replace misfitting plates, to thoroughly cleanse the teeth, and prescribe a soothing mouth-wash.

In a great many cases an alkali is indicated, which may be ap-

plied locally or administered internally, as the needs of the case seem to indicate. I have found an acid condition of the oral fluids accompanied by an atonic dyspepsia present in a considerable number of cases, which is greatly improved by the internal administration of the following:

℞ Infusum columbæ ..... ℥ iv.
Liquor potassæ ..... ℥ ss.
M. Sig.—A dessertspoonful ter in die before meals.

If the urine indicates a condition of general acidity of the system, this may be relieved by giving bicarbonate of potassium well diluted, or in the form of an effervescent draught; one of the best means is the old familiar cream of tartar lemonade, made by dissolving a quantity (1 to 18) in boiling water, and adding some sliced lemons and sweetening to suit the taste. It may be partaken of freely until the saliva loses its ropy character.

Trimethylamin breathed in through the mouth for a few minutes at a time will increase the flow of saliva, and at the same time restore its alkalinity. The catarrhal condition is, however, to be treated by topical applications, which may combine some form of alkali, as in the following:

℞ Potassii chlorat. ..... ℥ j.
Acidi carbol. ..... ℥ ss.
Glycerol ..... ℥ j.
Aquæ dest. ..... ℥ iv.
M. Sig.—To be used as a mouth-wash, or painted over the affected parts.

Lead-water and laudanum has long been used as a palliative wash after the removal of calculus. The following is a convenient formula:

℞ Plumbi acetatis ..... ℥ ss.
Tinct. opii ..... ℥ ss.
Aquæ dest., q. s. ..... ℥ iv.
M. Sig.—For local application only to the gums.

Or the wounded parts may be painted with the dental tincture of aconite and iodine.

I have also found resorcin a very useful drug to use in these cases. It may be used in the form of ten per cent. aqueous solution or in the following:

℞ Resorcin ..... ʒ ij.
Sodii salicylas ..... ʒ j.
Sodii biboras ..... ʒ j.
Glycerol ..... ℥ iv.
Aquæ, q. s. ad. ft. ..... fl. ℥ viij.
M. Sig.—Lotio, ter in die.

Dr. Carl Seiler's tablets in solution make a most excellent wash.

Thiol, in the powdered form, may be sprinkled over the gums with good results, or applied to the wounded parts as an ointment with cocoa butter, in the strength of one per cent., or in the liquid form it may be penciled over the gums. It is absolutely inodorous, and very efficacious as a palliative drug.

An old stand-by in somewhat modified form is to be found in the following:

℞ Acid. boric. ..... ℈ ij.
Tinct. myrrh. ..... ʒ jss.
Aquæ ..... ℥ vjss.
M. Sig.—Lotio.

Oil of eucalyptus, in combination with other antiseptics, thymol, camphor, etc., used as a spray or penciled over the surface, are excellent remedies. To these may be added the proprietary medicines, such as listerine, aristol, phenol sodique, creosote carbonate, tribrom-phenol-bismuth, and cocillana, fluid extract used as a spray.

In the chronic and suppurative form of pyorrhea the general line of treatment should be stimulating and antiseptic for the local lesion, combined with constitutional remedies when complications present.

Let us first take up the uncomplicated form, where there is more or less destruction of the alveolar process, with consequent loosening of the teeth involved. The first step in treatment is mechanical, consisting of the thorough removal of all calculus, salivary and serumal, from the neck and roots of the teeth, and washing out the pockets with some antiseptic solution that will put the parts in a better hygienic condition. After a number of years' experimentation, I have settled down to the use of H_2O_2 as the best agent to begin treatment with. It is a mechanical cleanser and antiseptic combined that has no superior. It is very diffusible, and readily penetrates into all pockets and sinuses, bringing the débris

to the surface. There are a number of different preparations on the market, but for stability and variety of form I have no hesitation in recommending pyrozone. The three per cent. aqueous solution contains less than one-twentieth of one per cent. of free acid, and the five and twenty-five per cent. ethereal solutions only a trace. The presence of a small proportion of acid is essential to the stability of all preparations of H_2O_2. Its presence is not, however, detrimental, as it can be readily neutralized by the addition of one or two grains of carbonate of magnesia, or, what is better still, by using a part or a whole tablet of soda-mint. This must be added to the portion of pyrozone to be used in the treatment, and not added to the stock, for the reasons above stated. So used, it produces marked effervescence, and by liberating the extra atom of oxygen more rapidly than without it, adds materially to the value of the drug as an antiseptic and cleanser. Another precaution that is well to observe is the bringing of the solution to the temperature of the body by immersing the beaker containing the solution in a vessel of hot water. By so doing, the temperature is raised and pain is many times avoided in its application. The high temperature also favors disintegration of the solution. The three per cent. form, prepared as above, is used from time to time during the process of removal of the calculus from around the roots. The mechanical treatment of these deposits cannot be too thorough, and seldom can be accomplished at one sitting without prolonging the operation too long. After removing the calculus, attention should be given to the articulation as one of the causes of mechanical irritation. This is too often overlooked by dentists. If any particular tooth is striking too hard, so as to give rise to pericementitis, it should be ground off or a rubber cap placed upon the adjoining tooth until the pericementitis shall have subsided and the tooth settled back into its socket. Many times it will be found that there is a permanent malocclusion that may give rise to a recurrence of the irritation. In such cases the irregularity must be corrected by mechanical means, such as regulating or grinding off the offending teeth or capping the adjoining teeth that may have been unduly worn down.

Before dismissing the patient, prescribe three per cent. pyrozone and soda-mint as a mouth-wash, and let two days at least in-

tervene before making a second appointment, so as to allow for the certain improvement in the local conditions before resuming the mechanical treatment. At the second sitting the pockets should be packed with cotton saturated with three per cent. pyrozone and cocaine, and allowed to remain for a few minutes before beginning operations. By so doing the pockets will be distended and the cocaine will produce local anesthesia and lessen the vascularity for the time being, although the subsequent hemorrhage will be the more profuse by reason of its use. The dilation and blanching of the parts by the cocaine solution will enable the careful operator to thoroughly examine all exposed surfaces and determine whether or not he has removed all concretions.

In case he cannot see all parts of the pocket, he must depend upon a cultivated touch to determine as to the thoroughness of the cleansing process. Any small portion overlooked will serve as a nucleus for further deposits and prevent absolute cure. After satisfying one's self of the removal of all deposits from the roots, then rinse the pockets out thoroughly with three per cent. pyrozone, and finish by using the five per cent. solution. If a stronger solution is wanted at this sitting, it may be obtained by shaking together two parts of the twenty-five per cent. ethereal solution and one part distilled water, and separating through a funnel. The lower portion will be found to contain about a twenty-five per cent. of absolute H_2O_2 aqueous solution, which may be diluted to any strength desired and used with perfect safety, as it will not injure healthy tissue, although destroying granulation, infected and diseased tissues. Healthy tissues are bleached white by its action, but soon return to their normal condition.

For applying the stronger solutions, use the well-known medicine drop-tube, by drawing out the points of several and giving them different curves, some rights and lefts, and some simply right angles. Instead of the white rubber bulbs, use the black ones, as they are not affected by the pyrozone as are the white ones. With this simple and inexpensive syringe the five per cent., and even the twenty-five per cent., solutions can be introduced with convenience and perfect safety. Nevertheless, always take the precaution to dip the hands in water before using these solutions, and to moisten the patient's lips and keep a wet napkin over the lower

portion of the face as a safeguard against the desiccating effect of the drug, should it come in contact with healthy tissues.

At the close of the second sitting the patient is instructed to continue the use of the three per cent. solution freely, and return the next day but one following, when, if any of the teeth do not seem to be improving, the pockets are again packed with the three per cent. solution and cocaine, and a third attempt made to discover any overlooked deposits on the roots. In case the pockets still appear angry and the teeth remain loose, they should be treated with the twenty-five per cent. ethereal solution, either by using the drop-tube or by wiping them out with cotton saturated in the solution, and wound around a Japanese toothpick held in an adjustable handle that will allow of the placing of the pick at different angles. The patient is dismissed with careful instructions as to absolute cleanliness of the oral cavity, and, if necessary, shown how to use the brush and floss silk between the teeth. In most cases this is all that is necessary, and the continued use of the three per cent. solution of pyrozone as a mouth-wash will accomplish a permanent cure. Some object to the soapy taste left in the mouth by the drug, but this soon disappears, especially if the soda-mint is used as directed. From the success that has followed the above system of treating pyorrhea alveolaris, no one drug will accomplish as much in as great a number of cases as the pyrozone solutions following thorough mechanical treatment.

If a considerable portion of the alveolar wall is lost by absorption, then it will be found necessary to fasten a number of teeth together and thus secure immobility, a condition very essential to the best results in bad cases. This may be done by ligating with cord or wire, but is, however, better accomplished by bands soldered together, or by raised caps, cemented into the teeth loosened by disease, and perhaps, in some cases, including a few teeth not diseased.

In some instances, however, by reason of lack of coöperation of the patient or his systemic condition, success does not immediately follow. In such cases other lines of treatment are necessary. If the tissues remain flabby and fail to shrink around the teeth, the chloride of zinc is a most excellent remedy. It is antiseptic and astringent. In fact, before the advent of H_2O_2 I used it

almost altogether, in full strength, fifty per cent. solution for the pockets, and well diluted as a mouth-wash, as follows:

℞ Zinci chloridi ..... gr. xx.
Aquæ dest. ..... ʒ iv.
M. Sig.—As directed.

Begin using it three times daily, diluted four times, and continue its use until the gums are blanched. It gives a persimmony taste, and is not unpleasant. Insist on having distilled water used in compounding the prescription, otherwise there is danger of a flocculent precipitate forming if kept for any length of time. This is probably due to the presence of carbonate of ammonia in the water, which may be overcome in stock solution by the addition of a small quantity—a few drops—of hydrochloric acid. Some druggists object to filling the recipe on account of the poisonous character of the drug. Always instruct the patients as to its poisonous character, and caution them to keep it out of the way of children.

Sozo-iodol is a di-iodo-phenol-sulfonic acid, and contains fifty-five per cent. of iodine, twenty per cent. of phenol, and seven per cent. of sulphur. The salts are odorless, and vary as to solubility. Sozo-iodol and zinc dissolve quite readily, while the mercury combination dissolves more slowly.

The sozo-iodol and zinc is a favorite form. Also used as an ointment for packing pyorrhea pockets. If its application is painful, add a few grains of acetate of morphia to the ounce, as follows:

℞ Sozo-iodol and zinc ..... gr. viii.
Morph. acetatis ..... gr. ij.
Lanolin ..... ʒ j.
M. Sig.—Use as a topical application in pockets.

Where a decided escharotic action is desired in chronic cases, trichloracetic acid (twenty per cent.) will be found useful, and will produce less inflammation than the same strength solution of nitrate of silver. The indications for its use are a considerable degree of tumefaction, with a tendency to eversion of the free margins of the gums, due to excessive granulation. In some cases it is necessary to precede its application by a ten per cent. cocain solution. The same results may be obtained by applying a ten per cent. solution

of chromic acid, and it will be found preferable to trichloracetic acid, being fully as efficacious and much less painful.

Robin recently presented a new combination of iodine, under the title of "iodozone," which he claims is a powerful antiseptic, and which has been employed successfully as an oral antiseptic. It is said to be a white liquid with all the good and few of the bad qualities of iodine, being less irritating and caustic in its effects.

Dr. Black advocates the use of oil of cinnamon and carbolic acid as follows:

Oil cinnamon ..... 1 part.
Carbolic acid (crystals) ..... 2 parts.
Oil gaultheria ..... 3 parts.

Syringe pockets once in four days, full strength. He further recommends for an after-treatment, after parts have shown a tendency to heal, a mouth-wash to be used by patients,—the 1-2-3 mixture just described, diluted one-half with anise oil or oil of lemon—on a brush. He also recommends eugenol and bichloride of mercury. The latter is objectionable as a permanent mouth-wash because of its poisonous qualities and its action on the teeth. Creolin has been advocated by some. The main objection to its use in the mouth is the bad odor produced by it when brought into contact with pus in any quantity. Camphoric acid has of late years been used in the treatment of purulent conditions with marked success, and seems to be specially indicated in pyorrhea alveolaris as a mouth-wash in the strength of one-half grain to the ounce of distilled water or peppermint water. It may be used in one per cent. solution in pockets.

Lysol may be used, five per cent. solution, for syringing out pockets, but is hardly suited for use as a mouth-wash. It is perfectly innocuous, and has almost a specific action on suppuration. It is slightly stimulant in a one per cent. solution, but not irritant, and for this reason hastens granulation. It gives a peculiar soapy feel to the tissues.

Among the latest remedies propounded, asepsin has a very high place, and may be used as an aqueous solution, or as a spray in the form of the following mixture:

℞ Pomade of juniper ..... ℥ j.
Asepsin ..... gr. iij.

Acidum asepticum has much the same property as H_2O_2. It is a bor-cresol hydrogen peroxide, and when diluted with water to the strength of ten per cent. forms a most useful wash. When brought into contact with pus or blood, free oxygen is formed in considerable quantities, to which it undoubtedly owes its antiseptic properties. It has a slight odor and caustic taste, and no doubt will find a place in the dental pharmacopeia.

Attention is called, in this connection, to sulphite of zinc, styrocol, and sulphonal as probably remedies that may be found useful in the treatment of pyorrhea.

Constitutional complications.—Where it is suspected that some complication exists, it is always best to treat the case in consultation with the family physician. In most cases the patient will be referred to you by the medical practitioner to attend to the oral trouble, in which case he will have already made the diagnosis of the constitutional disease.

The most common to present is rheumatism. A patient under treatment, has a recurrence of pyorrhea alveolaris every time she has an attack of rheumatism, and while she derives some degree of relief from the constitutional treatment received at the hands of her physician, yet she almost invariably reports to the clinic for dental treatment before she is fully cured. On the other hand, local treatment when applied first affords little or no relief, and resort has invariably to be had to constitutional remedies. These are in the nature of alkalies to reduce the high degree of acidity present in the fluids of the body, coupled with some drug that will act to remove the morbid processes already established. This treatment is based upon the theory that there is an excess of acid (probably lactic) in the blood, and the satisfactory results derived from the use of an antacid seem to conclusively prove the correctness of the theory. Then if our theory, that the local inflammation of the peridental tissues is due to lactic acid, is correct, the fact that pyorrhea alveolaris is found in connection with rheumatism also indicates that the lactic-acid theory of rheumatism is the correct one, and explains the close association of the two diseases, and the two theories support each other. Tartarlithine is spoken of very highly as almost a specific in the treatment of rheumatism and rheumatoid gout.

In connection with the constitutional treatment, and in addi-

tion to the ordinary mechanical and antiseptic treatment which has been advocated earlier in this paper, the use of a new drug is presented, asaprol, a mono-sulphate of naphthol, which, according to Stackler, is neutral in its reaction and readily soluble in alcohol and water and is not altered by heat. It is non-irritant, only slightly toxic, and well borne by the digestive tract. It is asserted to be a good germicide, arresting the development of, among others, the streptococcus aureus and the pyocyanine bacillus, both of which have been accredited the rôle of causing rheumatism. In addition to its internal use, it is especially indicated for hypodermic injection into the gums in cases where they are highly congested and painful neuralgic complications are presented. It is analgesic, and will control the neuralgia and overcome the local suppuration.

Solutions of the strength of from two to five per cent. may be used as a mouth-wash, and the pockets may be packed with a paste of lanolin and asaprol, using three parts of the former to one of the latter. In the treatment of gout or the gouty diathesis, where it is found as a complication of pyorrhea alveolaris, many things must be borne in mind.

The most prominent feature in such cases is neuralgia, which may be relieved by some one of the many forms of analgesics. One that has been very efficient, and which is not generally used, is gelsemium, which, if given in twenty-minim doses every half hour for three doses, has never failed to give relief.

For constitutional treatment, nothing has superseded colchicum as a specific. To control the paroxysms, acetated tincture of opium may be combined with wine of colchicum root in the proportion of one of the former to two parts of the latter, and administered in from twenty to thirty-minim doses, repeated every hour until relief is obtained. In some cases the opium is rejected by the stomach. In such cases substitute bromide of lithium for the opiate. The gums over the affected roots should be painted with the dental tincture of iodine, or with the following:

℞ Potass. iodidi ..... ʒ ss.
Potass. bicarbonatis ..... ʒ ss.
Aq. bullientis ..... ʒ viij.
Tinc. opii ..... fʒ j.

M. Sig.—Apply on small rolls of cotton, and place oiled silk next cheek.

Prescribe lithia water, and restrict the diet to farinaceous food, milk, and white meats. A tonic laxative may be substituted for the lithia water if there is indigestion. The patient should get as much out-door exercise as possible, and the same lines of treatment adopted for the local disease as have been indicated for ordinary cases of pyorrhea alveolaris.

DOBELL'S SOLUTION, FOR PYORRHEA ALVEOLARIS.

Western Dental Journal, October.

In pyorrhea, as in catarrh, one of the most effective therapeutic remedies is found in "Dobell's Solution." The prescription is as follows:

Ac. carbolici	℥ iss.
Sodii bicarb.	
Sodii biboratis, āā	ʒ iv.
Glycerini	ʒ xivss.
Aquæ, q. s. ad	℥ vii.

It can be used in full strength as a wash, and equal parts with water as a spray.

WASH FOR PYORRHEA ALVEOLARIS.

DR. A. W. HARLAN, CHICAGO.

Dental Review, July.

A very useful combination for pus pockets is the following:

℞	Alumnol	gr. xxx.
	Resorcin	gr. xxiv.
	Oil cassia	min. v.
	Distilled water	℥ ij.

M.

This will make an emulsion. It can be injected into the pockets direct or be diluted and used as a mouth-wash. It is very pleasant to the taste.

RUBEFACIENTS AND VESICANTS.

DR. A. W. HARLAN, CHICAGO.

Dental Cosmos, April.

There are many conditions requiring the use of a rubefacient, and not a few where a blister is of immense value. His opinion is that rubefaction and vesication, as remedial measures, are not taken advantage of by dentists sufficiently often to make them familiar with their objects in medicine.

What is a rubefacient? This is the definition of Dunglison: "Rubefacient; producing redness, a medicine which produces redness of the skin. The action is called rubefaction, a gentle, local irritant. Blisters are used as counter-irritants. A blister applied for a few hours to produce this effect is termed a fly-blister. A perpetual blister is one kept open by appropriate dressing." Perhaps the simplest case of dental disease is pulpitis. Of what value would rubefaction be to the patient? Local anodynes, and even local anesthetics, often fail to give relief, and the pulp is doomed to die from lack of appropriate measures. In many cases of this nature the application of hot water to the neck and above the ear on the affected side, by means of a few thicknesses of heavy toweling (six or eight thicknesses) soaked and partially wrung out, will prove efficacious if continued from five to ten minutes. In nearly all cases of pain around erupting third molars the use of water about 120° F. to 130° F., covering an area of from four to six inches from the local point, will give the necessary relief in a few minutes. The direct application of a small jet of water in the mouth on the inflamed surface is both painful and injurious, as gentle unloading of the engorged vessels is not accomplished in this manner.

For minor ills of the gums (in pyorrhea) rubefaction may be accomplished without vesication, by using a saturated solution of menthol in alcohol, or even less than this, down to a ten per cent. solution. Oil of peppermint, oil of turpentine, or oil of cloves will produce reddening, and when used over a large area will often so alter the blood-current that there will not be anything more than swelling, without suppuration. Rubefaction may be produced with chloroform, camphor, and aqua ammonia. Mustard and capsicum are also used for this purpose. It must be remembered that the

object of rubefaction is to draw the blood from a circumscribed inflamed area, and fill other unstimulated points, giving nature an opportunity to recover. He has been surprised and grieved to find that rubefaction is practiced on too small a territory, not sufficient to give the desired relief. Estimated that an inflamed spot is one-half inch square, the rubefaction should cover ten times this area in a locality which will direct the flow of the blood elsewhere, and relieve the tension on the arteries or arterioles. In acute pericementitis, in addition to rubefaction, it may be necessary to produce vesication—blistering. Many agents are used for this purpose, none of them very nicely or in appropriate places. A blister to relieve pericementitis in a superior central incisor should be made over the roots of the bicuspids, and the gingival margin of the gum; around the central incisor, should be painted at the same time with compound tincture of iodine. The blood-supply will be deflected and the resolvent effect of the iodine will soon be felt around the apex of the root. The gum must receive at least two paintings. This rule applied to all such cases will give much cause for congratulation from clients. Ammonia, capsicum, cantharides, or black mustard oil will produce blisters. Carbolic acid will produce a poor blister. Do not use zinc chloride for this purpose. A blister will do no good after the formation of pus around the apex of the root. Rubefaction may do something to alleviate the pain, but a blister increases it. Rubefaction and blistering for inflammation of the gums and the peridental membrane, facial neuralgia, as well as the pulp of a tooth, will be more efficient than leeching and purging.

A modification of Mayer's hammer may be used with good effect for rubefaction. Mayer's hammer is a steel disk, which is dropped in boiling water before it is used on the mucous membrane or the skin. The one he uses is about the size of a copper cent and twice as thick, with a handle that is screwed into it while it is in the water. By applying this gently over three or four inches of space, great reddening is produced.

What the patient needs is a new sensation; this he gets with a blister or a rubefacient. When you are about to produce rubefaction or vesication, do it with your whole soul. Do it well; do not be afraid. Use blisters in inflammation, and rubefacients in con-

gestion or stagnation. An ugly blister is not needed, as it will cause sloughing, and this is unnecessary around the mouth or on the face.

SODIUM-POTASSIUM FOR PUTRESCENT ROOTS.

B. H. CATCHINGS, ATLANTA.

Dr. Schreier introduced a valuable treatment for putrescent root canals, when he brought forth the above. The material must be handled carefully, not allowing it to touch the skin. After the dam is adjusted, remove as much of the contents of the canal as possible with a cottoned broach. After placing some of the sodium-potassium on a glass slab take up small particles, which adhere readily to a broach, and pass the material into the canal. If too much is carried in, there will be an explosion and fire, but not to harm. The sodium-potassium will saponify the contents of the canal, which should be wiped out with cottoned broaches and then injected with pyrozone. The canals are then to be thoroughly dried, and may be filled at once; or to be perfectly secure against further trouble, they can be filled with cotton and the cavity sealed for a time.

STERESOL.

Dental Cosmos, April.

The following new preparation is highly recommended to the profession by Dr. E. C. Kirk, especially in the treatment of pyorrhea cases:

The object aimed at in the production of stérésol was to secure an easily applicable antiseptic dressing, which should possess the property of adhering to moist or denuded mucous surfaces, acting as a protective covering against reinfection, and at the same time exerting a sterilizing effect upon the protected surface. It was desired also to avoid all caustic or irritating effects, and at the same time induce a sedative or even local anesthetic impression.

After numerous experiments, the following preparation was found to combine the qualities and properties sought for:

Purified gum lac	270 gms.
Purified benzoin	10 gms.
Balsam of tolu	10 gms.
Carbolic acid, crystallized	100 gms.
Oil Chinese cinnamon	6 gms.
Saccharin	6 gms.

Alcohol, q. s. to make 1 litre.

The use of carbolic acid in the strength solution above given (10 per cent.) is found to be non-irritating and to produce a decidedly local-anesthetic effect. The antiseptic feature of the carbolic acid is reinforced by that of the saccharin.

Both chemical and bacteriological tests of the preparation have been made, which show that it has high antiseptic value, and that its activity when applied to mucous surfaces extends over a period of at least twenty to twenty-four hours.

In dental practice, stérésol is applicable in treatment of inflammatory conditions of the mucous membrane and gum-tissues, ulcerations, aphthæ, mercurial stomatitis, gingivitis, difficult eruption of third molars, treatment of pyorrhea alveolaris, etc.

In the treatment of pyorrhea pockets the preparation seems to be of especial value; a thorough painting of the surfaces after removal of concretions, deposits, etc., exerts a most soothing and beneficial effect upon the soft tissues, and furnishes an effective barrier against reinfection of the parts by micro-organisms in the oral fluids.

The preparation is of thin, syrupy consistence, and dark brown color. The color depends largely upon the grade of gum lac used in its manufacture. By using the best grade of purified or bleached lac a lighter preparation results, which, when applied to the skin, is not especially noticeable.

STIMULANT AFTER EXTRACTION, OR DURING PROLONGED OPERATIONS.

DR. W. H. JONES, FULTONVILLE, N. Y.

Southern Dental Journal, August.

A glass of Horlich's malted milk, to which is added fifteen or twenty drops aromatic spirits of ammonia, given the patient after extraction, especially where a number of teeth have been ex-

tracted, will revive and strengthen the patient. As a stimulant during prolonged and tedious operations it is a boon to both patient and operator.

TOOTHACHE REMEDIES.

Zahnarztliches Wochenblatt.

℞ Cocaine hydrochloric,
Aq. laurocer,
Tinct. arnica.....āā 1.00
Liq. ammon. acetic..... 10.00

Apply on a pellet of cotton in the cavity of the tooth.

Another remedy—

Acid carbol. crystals,
Cocaine mur,
Menthol.....āā 1.00
Glycerine..... 20.00

TOOTHACHE REMEDY.

Merk's Market Report.

Menthol.....ʒ ij.
Concentrated ether.....ʒ iv.
Oil cloves.....ʒ ij.
Fl. ex. aconite.....ʒ i.

Saturate a pledget of cotton and press carefully into the hollow tooth.

POULTICING A TOOTH.

Dr. Hugenschmidt recommends the only practical poultice that can be used in alveolar abscess, a fig boiled in a solution of borac acid and cut in halves, and the surface sprinkled with powdered borac acid. It will in most cases cause the abscess to discharge into the mouth. Should the abscess be far advanced and threaten to break through the cheek, then apply an ice compress with the above.

THE USE OF CERTAIN DRUGS IN NERVOUS CONDITIONS—CASES OF EXCESSIVE HEMORRHAGE—ANAESTHESIA AND TREATMENT OF COLLAPSE AND SHOCK.

DR. RUSSELL H. COOL, OAKLAND, CAL.

Pacific Stomatological Gazette, December.

Let us remember that we have nervous conditions to deal with sometimes, as well as the eradication of decalcified tissue; that sometimes there is a sensitive, quailing invalid behind the cavity that is being artistically filled. We should have in mind our duty to the patient, and know that often we can relieve him more by systemic treatment than by any local manipulation, however skillful it may be, upon the teeth themselves.

I shall endeavor to give the result of my experience in practice regarding the use of certain drugs in nervous conditions, in cases of excessive hemorrhage, anesthesia and the treatment of collapse and shock.

The study of the human face becomes absolutely unavoidable in successful practice. One patient that an injury will produce no visible effect upon will be followed by another that a much slighter operation will produce a serious and enduring impression, and yet both of these patients are apparently in perfect health; still there is an unlikeness in their temperament which should be our guide in calculating the effect of an operation.

In handling extremely nervous patients it is our duty to use any and all remedies at our disposal in an intelligent manner. Aromatic spirits of ammonia, administered previous to a tedious sitting will often have a pleasant effect, also antikamnia, or combination of antikamnia and codeine. Phenacetine, or phenacetine and caffeine, acetanilide, antipyrine, or, in some cases, morphine sulphate, or, in conjunction with morphine, atropine, one-fourth grain of the former and one one-hundred and fiftieth grain of the latter can be used advantageously, and a patient that would be a suffering, howling torment to the operator will become as docile and quiet as a lamb. Extreme cases come to us, and we should be as equal to an emergency as any surgeon. No surgical operation upon the human body is free from danger.

The first and most important of the consequences of any operation is hemorrhage. Though with every surgical operation there must always be a small amount of blood lost, it is the aim of the operator to lose as little as possible. The more the hemorrhage, the slower the repair; and the less the blood is lost, the quicker the repair; also in proportion to the loss of blood shock takes place.

I wish to draw attention to those remedies most important in hemorrhage, and anesthesia, and shock—those that are most energetic in producing a decided effect without loss of time. Here is a patient who has lost a certain amount of blood; is in a condition of such questionable nature that the operator is uncertain whether the subject will live or die, and sometimes these patients die. Why? Because the proper remedies are not administered. This frequently is the result of ignorance of those who are in attendance.

There is probably no dentist who has not had experience with anesthetics when compelled to perform a surgical operation within the mouth or upon the associated part. How many have found patients with rapid respiration, rapid or intermittent pulse, patient filled with fear of the consequences of efforts to repair some pathological condition. Such patients are most frequently anesthetized without any preliminary preparation, and are frequently the source of great anxiety to the operator and the consulting physician. I have taken part in cases where the lips have turned pale, even purple, the finger nails turned black, a cold perspiration spring out over the entire cutaneous surface, respiration cease, pulse nil, and patient apparently in a moribund condition, where, to the casual observer, death must certainly take place; and yet with the hypodermic use of whisky, aromatic spirits of ammonia, digitalis, nitroglycerine and artificial respiration, the circulation and respiration of this patient speedily took place and the patient returned to life.

ALCOHOL.—May be injected at a temperature of ninety degrees, thirty gtt. to ʒ i without sloughing. A temperature below this or above may produce sloughs. Flood made two hundred injections of whisky in coffee in four hours with complete success, though at the same time he injected ten to twenty minim doses of tincture of belladona, which may have contributed to the result.

AMYL-NITRIS.—Sedative and antispasmodic; lowers tempera-

ture by ozonizing the blood; relaxes arterial system; reduces arterial pressure. Sixteen to eighty minims have been injected in a dog, and ninety minims in a man, but ten minims is an unsafe dose hypodermically.

In a formula of ten parts amyl-nitrite, alcohol thirty parts, glycerine sixty parts, total one hundred parts, eight to fifteen minims should be injected every hour as the condition of the patient should warrant—that is, the absence of color in the face, a small and frequent wiry pulse.

NITRO-GLYCERINE.—A powerful poison. One to six gtts. of one per cent. solution produces fullness, quickness of pulse, diminution of arterial pressure, similar in its effect to amyl-nitrite, and can be used in hemorrhage, in stimulating heart action without causing perceptible increase of arterial pressure; hence a remedy of much importance in hemorrhage, because it increases the vital forces without producing arterial fullness, which would result in further hemorrhage and possibly death. Would advise the injection of one drop of one per cent. solution a few minutes before the injection of cocaine. Would suggest also its use to the extent of one, two, or three drops in all cases of collapse after the administration of an anesthetic or any surgical operation, but would recommend in addition to this remedy the speedy hypodermic injection of aromatic spirits of ammonia, whisky, and digitalis. The three latter agents may be used hypodermically in from one-half to one drachm doses, and these doses may be repeated every half-hour if the patient is in extreme collapse, but, if in ordinary cases of hemorrhage, with but slight shock to the patient, fifteen minims each of these three remedies at a temperature of ninety degrees, with injection of two or three minims of nitro-glycerine and inhalations of nitrite of amyl, are sufficient to stimulate the vital forces and bring the vital organism back to its normal condition.

The question arises in our minds: what parts of the human anatomy should we avoid in the use of the hypodermic needle, and of what parts we should make use? The places to be avoided in puncturing are veins, inflamed parts and bony prominences; to be more expressive, it would not be wise, if you desired to give any medicated injections, to insert the needle through the skin on the inside of the tibia, on the dorsal surface of the foot, on the back of the hand or fingers, on the scalp, on the forehead, over the olecranon

process, or posterior to the ear. These parts are principally bony tissues, covered mostly by skin, and almost devoid of lymphatics, the latter being eminently necessary in taking up a medication and carrying it to the central organs to procure the required effect.

Having considered the points on human anatomy to be avoided, I will now speak of those regions which are the most appropriate for the assimilation of agents that we desire to equalize the circulation and to stimulate the nervous system.

The external part of the arm, away from the principal blood-vessels; the outer side of the thigh, away from the principal blood-vessels; in the abdomen, where there are practically no blood-vessels, and in the chest tissues, where there is also an absence of important vessels.

Now a word about the syringe, which should be thoroughly sterilized. After drawing the required amount of liquid into the syringe, shall we immediately insert the needle through the skin and inject the fluid therein? Most certainly not, because in drawing a fluid from a receptacle a certain amount of air must certainly be in the barrel of the syringe, hence it will be necessary to place the syringe in a perpendicular position, the needle uppermost, and the piston must then be pushed forward until all the air is forced from within, and one drop of the fluid appears. Lack of attention to this particular point is the cause of a great deal of sloughing and disagreeable effects, and the injection of a minute portion of air has resulted fatally.

Also one word regarding preliminary treatment of anesthetic cases, or those particular cases in which, with the usual observations, we frequently find the pulse abnormally rapid, the patient timid, the respiration rapid, and all indications present of a slight shock before any surgical interference. There are medicines in the pharmacopeia that will destroy those depressive conditions and permit us to continue to operate in safety—considering that the heart and kidneys are in a normal condition. It is well to administer one-fourth grain of morphine by the mouth one hour before an operation. Fifteen or twenty grains of bromide of potash have also a happy result in quieting the nervous system, and when administered with brandy we have the cerebral sedative and cardiac stimulant. Chloral, five grains; morphine, one-fourth grain; brandy, one

ounce, have, with me, destroyed in the majority of cases the usual nervous symptoms that are unpleasant as a precedent to any operation. These same agents may be administered with benefit to our patients when operations are performed without anesthesia.

It is unnecessasy to dwell upon the doses of digitaline, ergotine, cocaine, atropia, strychnia and various other important agents useful in conjunction with these extreme cases. The dispensatory and pharmacopeia will explain their uses and doses.

ULYPTOL.

American Therapist.

Salicylic acid	6 parts.
Carbolic acid	1 part.
Oil eucalyptis	1 part.

Use as an antiseptic dressing.

EXCESSIVE VOMITING.

Pacific Coast Dentist, November.

Excessive vomiting is easily controlled by administering one-half to one drop of oil of cloves in a little water.

ANTISEPTIC MOUTH WASH.

Ohio Dental Journal, October.

Dr. F. G. Novy recommends as an antiseptic mouth-wash:

℞	Saccharin	2.5 grams.
	Benzoic acid	3.0 grams.
	Absolute alcohol	100.0 grams.
	Oil of peppermint	0.5 grams.
	Oil of cinnamon	0.5 grams.

Sig.—Dilute with nine parts of water and hold in the mouth one minute.

TOOTH WASH.

British Journal Dental Science, June.

Castile soap ..... 13½ oz.
Water ..... 3 lbs. 6 oz.
Dissolve by heat, add—
Glycerine ..... 36 oz.
Alcohol ..... 3 lbs. 6 oz.
Oil of peppermint ..... 1 oz. 5½ drs.
Oil of wintergreen ..... 1 oz. 5½ drs.
Syrup ..... 4½ lbs.
Tincture of cudbear ..... q. s.
Filter.

A fragrant tooth-wash, for cleansing and preserving the teeth and gums, imparting a fresh taste and feeling to the mouth. Directions for use: Dip the brush in water (soft or rain-water the best), then pour a small quantity of the wash on it, and rub it on the teeth; it forms a froth in the mouth, which should be allowed to penetrate every crevice.

TOOTH PASTE FOR COLLAPSIBLE TUBES.

Precipitated chalk ..... 8 ozs.
Orris root ..... 8 ozs.
Oil of cloves ..... 1 dr.
Honey enough to form a paste.

ORAL SURGERY.

WASHING OUT THE ANTRUM.

Pacific Coast Dentist, April.

In writing on the subject of the antrum, W. D. Babcock, M. D., makes a good suggestion about washing out the cavity. He recommends the use of a fountain syringe, the water supply not to be raised high above the head. As the liquid enters the cavity have the patient to put his head into different positions, so that the fluid can reach all parts of the cavity.

FRACTURE OF LOWER JAW—TREATMENT.

DR. W. W. COON, ALFRED, N. Y.

Dental Cosmos, December.

The procedure consists of fitting a metal band accurately to one or more teeth contained in the distal fragment, and soldering to its buccal side a stiff metal bar that shall, when the fracture is reduced, pass in apposition with the buccal side of a loosely fitting band or bands surrounding a tooth or teeth contained in the other fragment or fragments. Then with the bands on the teeth (uncemented as yet) mark with an excavator point a line on each band the bar passes—a horizontal mark on a line with the bar and a perdendicular mark on both band and bar—to indicate where they shall be soldered; then remove and solder, all of which a dentist will accomplish with little or no trouble.

Competent assistance may be necessary in maintaining an accurate adjustment of the fragments while the bands and bar are being marked. This done, and the marked places soldered, what remains to perfect the "band-and-bar splint" is to crimp in the ends

of the loosely fitting bands, so as to firmly retain the cement used in its final adjustment, and placing it on the teeth again (the fractured fragments in right apposition), to determine the accuracy of the soldering. If any deviation has been made, it can be easily corrected, either in the bar or bands, as only the band to which the bar was first soldered is an accurately fitting one, and the appliance is ready for cementing in place. The bands are made loose enough to allow of considerable crimping in at the bottom, and to allow the applianee to be adjusted on the teeth before the fragments are in perfect apposition, as it is difficult to maintain such apposition with the mouth sufficiently open to allow it to be placed in position; but while it is going on the teeth with the cement for its final adjustment, the parts are brought into proper relation and rigidly held so for the little time it takes the cement to harden.

When this is accomplished, the fragments are held as in a vise. There is not the least mobility possible, and no undue strain is given the teeth, as is the case when they are ligated with wire or other material, or when Angle's method of fixation is used. The advantages are many, and very apparent to both operator and patient. The ease and quickness of construction are considerations of value to the operator. The absence of interdental splints and bandages, the use of the jaw in easy speech and mastication, and nothing in the mouth to prevent cleanliness, will be appreciated by all who are in the habit of appreciating anything.

The case for which the band and bar splint described was made, severely tested its utility with loose teeth that would not have withstood strain.

The patient, a middle-aged farmer, while backing a heavy seeder out of a barn, was struck under the jaw by the tongue of the implement with such force as to give him not only a single compound fracture of the right half of the body of the jaw, but to knock out what few upper teeth he had that came into occlusion. The left fragment of the lower jaw contained but one tooth, a second bicuspid, which was quite loose, the fracture being slightly oblique from the space of the first bicuspid toward the symphysis. He was suffering intense pain when brought to my office by the physician.

SPLINTING FRACTURED LOWER JAWS.

DR. T. L. GILMER, CHICAGO.

Dental Review, January.

An elevator boy received a fracture of the lower jaw at both angles.

By the force which caused the injury and by muscular contractions, there was much displacement of the fragments. The mouth, including the teeth, was cleansed as thoroughly as possible with a toothbrush, and the parts disinfected with hydrozone (3 per cent. solution) and oil of cassia in water. Then about the cervical portion of a number of teeth on each jaw, anterior and posterior to the compound fracture, was placed soft iron wires of sufficient length. These wires were tightly twisted to fit the teeth closely. The teeth of the fragments were brought into articulation with the teeth of the upper jaw, and the wires of the lower secured to those of the upper teeth, bringing the lower jaw firmly to the upper. To overcome the pull on the teeth by muscular strain, the bandage was applied loosely for twenty-four hours, when it was removed, as by this time muscular contraction was so far overcome as to render the bandage useless.

It is rarely the case that a mouth can be found, especially if there be a fracture of the jaw, in which no teeth have been lost. If all the teeth were in place and sound, and there was no opportunity to feed the patient through spaces between the teeth or by a small curved point syringe at the rear of the teeth, the writer would not hesitate to extract a bicuspid or molar for this purpose. Usually one tooth is loosened on the line of fracture; this may be sacrificed.

An excellent syringe for feeding the patient is that employed by the surgeon as a powder blower, but any bulb syringe with a sufficiently large nozzle may be used. The only objection to this method of treatment is the danger of choking in case of vomiting, but after the stomach has digested the food it contains, the danger is slight, and this same objection would apply to other methods when the lower is secured to the upper jaw.

The other method of treatment is by splint. An impression is taken of the teeth of both jaws. If the fragments of the lower jaw are out of place no attempt is made to hold them in place if they

are displaced readily by muscular action. Casts are now made from the impression, and if the lower alignment of the teeth does not permit exact original articulation with the teeth of the upper cast, the lower is sawed in two on the line of fracture and the cast reconstructed by articulating the occlusal surfaces of the teeth of the two pieces with the occlusal surfaces of the teeth of the upper cast. The two pieces of the lower cast are now secured to each other by the application of a little soft plaster. The teeth of the cast of the lower jaw are reproduced in Mellott's metal and on these is swaged a plate of German silver, silver or gold. This plate should extend down to cover at least two-thirds of the length of the teeth. Its length should be sufficient to cover several teeth anterior and posterior to the fracture. This splint should be cemented to the teeth with phosphate of zinc. This method is cleanly, easily made, and permits the mouth, if there be no other injuries of the bone, to be opened and closed at will.

NASAL PROSTHESIS.

DR. M. W. HOLLINGSWORTH, SANTA BARBARA, CAL.

Dental Cosmos, June.

The case presented was that of an old lady who had been afflicted with a cancerous growth which resulted in the loss—by a surgical operation—of the greater portion of her nose, leaving seemingly healthy tissue. On account, however, of her age, and the fear of a recurrence of the disease, she was deterred from resorting to plastic operation for restoration. As is observable in the illustration, the loss was confined to the cartilaginous portion embraced within lines which might be drawn from the upper termination of the septum articulating with the bony structure, downward on either side of the median line, to a point midway between the lower lateral cartilages and the cartilages of the nose, which were without power of muscular dilatation. The greater portion of the septum remained intact.

My first effort was to obtain a complete reproduction or model in plaster, without distortion; and in order to obtain this it was

necessary to give reliable inner support to the wings of the nostrils, to counteract pressure from the weight of plaster used to obtain the conformation of external surface. For this purpose well-softened modeling compound was first used and applied upon the end of a pine stick, especially formed and of convenient length. Pressed well up into each air-passage, the compound yielded a fairly accurate impress of the inner walls, but was destined to serve only as a vehicle for the ever-reliable plaster of paris, for which room was made by slightly trimming the surface of the compound upon removal. The nostrils being well oiled and otherwise prepared to prevent adhesion, the modeling compound forms, coated with plaster of creamy consistency, were again inserted, the plaster admitting of reaction from possible distortion before hardening. After the impressions were thus obtained, the projecting ends of the pine sticks were removed close to the nose, in order to prevent distortion by leverage. The wings of the nostrils being now supported from within, the external surface was thickly coated with plaster on one side, from cheek to median line, leaving a grooved perpendicular wall. This was shellacked and oiled in order to insure easy separation from a similar coating upon the other side. When well hardened, the lower extremity of the mask thus formed was surfaced, grooved, and otherwise prepared for the lower section, covering the ends of the two upper sections, as well as the forms in the nostrils, and embracing also a portion of the lip. The three sections were then removed inversely to the order in which they were applied, and again put together and prepared to receive plaster for the cast. The intro-nasal forms were preserved for future use.

After determining the individuality of the natural nose, from photograph and otherwise, a model of the substitute was formed in wax on the cast, the manner of attaching which now demanded attention. As external methods were, as far as possible, to be avoided for obvious reasons, preparation was made for internal support. The question of obstructing the air passages was confronted. Naturally, this was to be avoided by properly constructed tubes, for which gold was used, formed in the following manner: Use was made of the intro-nasal forms, as models from which to obtain metallic castings upon which the tubes were to be contoured. In order to prevent

FIG. 1.

FIG. 2.

irritation, the edges of the upper and lower ends of the tubes were turned inward, thus leaving the terminations slightly rounded. To the upper surface of each tube, on the septum side, were soldered strips of gold extending outward, to act as tangs for attachment. These tangs, bent inward, close up to the septum, formed a bridge over it when soldered together, the manner of obtaining the proper relative positions for which was as follows:

The tubes were placed in proper position, and, by the aid of a small pair of tongs suitable for the purpose, each was pressed toward the septum, and, while in this position, a small quantity of plaster was placed around the projecting tangs and allowed to harden, when all was removed. This done, the tubes were sufficiently imbedded in sand and plaster to admit of soldering. The ends of the tangs remaining unsoldered were bent over right and left, at a proper distance from the tubes, in order to form an anchor-head required for the vulcanite attachment.

The previously prepared wax model was now applied to the nose and secured to the anchor-head in proper relative position, with the aid of a small quantity of plaster. When safely removed, the familiar process of enflasking was next in order, and, with tubes uppermost, the nose was imbedded to the margins of external surfaces, the tubes and the inner surface of wax remaining exposed for the upper half of the flask. Packed with rubber of proper or approximate color, the flask was placed in the vulcanizer. But little surfacing was needed in the process of finishing, as flesh tints in oil colors were yet to be applied, and a glossy surface was not desirable. All excess of rubber was removed from inside of the nose close up to the anchor-head of the tubes, thus leaving a light and strong shell. When the two or three coats of paint were applied and thoroughly dried, glossiness was reduced by slightly rubbing the surface with pumice.

As will be seen in the profile view of the finished work, the upper edge of the nose is held in position by a small spring wire attachment to the spectacles.

MISCELLANEOUS.

COMPRESSED AIR IN DENTISTRY.

DR. C. C. SOUTHWELL, MILWAUKEE, WIS.

Dental Review, July.

This is an appliance to be used in many ways by the dentist, as the writer has shown. Over his laboratory sink is an automatic air pump. This pumps air, at a pressure to be regulated, into a kitchen hot-water tank. The tank is piped to both his laboratory bench and operating chair. The writer urges against the use of too much rubber tubing, on account of leaky unions and unsightliness.

The applications of compressed air are numerous. In the laboratory it is used for soldering and blowing of the various furnaces. At the operating chair its use is more varied. The writer names some of them, such as drying teeth to hold the dam in place after it is on, which in a great many cases dispenses with the ligature and clamp. Warmed air for chip blower—the air is made to pass through a coil, which can be heated with the annealing lamp. By increasing the pressure or increasing the heat, and using a very small nozzle, an excellent root drying method is had. With the heat removed, and the current from the small nozzle directed on a filling that is being finished with sand paper disks, the pain caused by overheating is obviated.

The hastening of the evaporation of volatiles and the better application for the reduction of temperature and consequent lessening pain during the use of the bur in the preparation of cavities or for the extraction of teeth, a strong and easily controlled pressure on an ordinary atomizer will prove itself invaluable.

In many instances the preparation of troublesome approximal cavities can be accomplished without pain, and marked relief given in all others.

For drying the abutments for bridges and roots for crowns, a steady, forcible blast will force the saliva back and prevent the weeping of gums, or the flow of blood getting in the way.

For obtunding sensitiveness—by directing a warm blast into the cavity, while excavating.

For pulp capping—by drying the cavity thoroughly. Submarine fillings can, with the dam reasonably well in place, be made with comparative ease, by the blast keeping the cavity dry.

In fitting bands for crowns, the saliva is blown out, giving good view for adjusting.

A NEW ALLOY RESEMBLING GOLD.

Journal de l' Horlogerie.

A new alloy has been discovered which resembles gold in color, ductibility, etc. It consists of 94 parts of copper to 6 parts of antimony. The copper is melted and the antimony is then added. Once the two metals are sufficiently fused together, a little magnesia and carbonate of lime are added to increase the density of the material. The product can be drawn, wrought and soldered, just like gold, which it almost exactly resembles on being polished. Even when exposed to the action of ammonical salts or nitrous vapors, it preserves its color. The cost of making it is about 25 cents a pound.

ALUMINUM, TO FROST.

Aluminum plate allowed to stand in a warm solution of caustic soda will take on a frosted appearance.

REPAIRING RUBBER ARTICLES.

DR. W. H. STEELE, FOREST CITY, IA.

Ohio Dental Journal, July.

When rubber articles in use about the office get torn or punctured, they can be made good as new with little expense. If a rubber bulb or section of tubing gets cracked or torn, take a coarse file and remove all dirt around the break, at the same time roughing the surface; put on a little "Major's Rubber Cement," and immediately

apply a patch cut from a piece of heavy rubber dam, and secure it in place until the cement sets. To repair the gas bag, rough up around the break with a file, cement on a patch of thin rubber dam, and when this has set, cement over it a piece of thin strong cloth.

PICKING UP AMALGAM.

Items of Interest, August.

Dr. Scott Thomas, Somerset, O., says the easiest way to pick up amalgam for conveying to the cavity is to press with a sliding motion the smooth surface of an excavator on the piece.

ASBESTOS—TO POWDER.

The Dental Journal.

Cut sheet asbestos into shreds and saturate with hydrochloric acid. Boil for a time, stirring at same time to thoroughly break up the fibers. The hydrochloric acid may now be washed out with water and the asbestos dried. This process reduces it to almost a powder, which may be molded into various forms, filtering funnels, soldering pads, etc.

BAND MATERIAL.

Dr. B. C. Brabson says a nickel (five-cent coin) rolled out thin for bands, etc., is superior to the German silver band material. It is tougher, has better color, is more easily soldered, and will yield more than twice as much band material as the Angle coil.

KEEP BURS CLEAR OF DEBRIS.

A dentist who acted as subject at a clinic makes the observation that burs when clogged are much more painful than when clear.

A bur lifted from the tooth every few revolutions causes much less pain than if held in contact all the time of excavation.

TO MAKE PIANO WIRE BROACHES.

DR. M. A. GREENLAW, SAN FRANCISCO.

Pacific Stomatological Gazette, August.

Nerve broaches that will do good satisfactory work, and be very cheap to obtain, can be made from No. 18 piano wire, after drawing the temper a little. A little experience will enable one to draw to any desired temper for any particular case. A Bunsen flame will do very well. The wire should be left sufficiently stiff to come back straight when the point is deflected thirty or forty degrees. Place a piece of hard wood, end up, in the vise, and with the corner of a file cut a light groove parallel with the jaws. This groove is to keep the wire from slipping while it is being filed. Place the piano wire in a pin vise and file it to a taper, with a square section, or slightly flattened, for some cases. Care must be taken to make the taper even from butt to point, or the broach will be liable to break. With a sharp graver nick the square corners of the broach, and the result is a series of barbs that will stand a great deal of use. The barbs may be placed on one, any, or all corners, according to requirements.

TO CLEAN PLASTER CASTS.

White plaster casts may be cleaned by making a thick paste of cold starch, with which the figure should be covered, using a brush for the purpose. When the starch dries, knock it off in light flakes and brush with a clean, soft brush, or wipe with a clean cloth.

TO MEND A BROKEN CABLE.

DR. W. H. STEELE, FOREST CITY, IA.

Ohio Dental Journal, June.

Bend a piece of brass in the shape of a tube, of proper size to fit snugly over the broken ends of the cable. Thoroughly clean the broken ends of all grease and dirt; slip them into the tube; put on a little soldering acid; lay a piece of jeweler's soft solder along

the open joint of the tube; hold the tube over a spirit lamp until the solder melts and flows into it and around the broken cable. Trim off all surplus solder, round off all sharp corners, and, if the work has been properly done, this will be the strongest part of the cable.

CEMENT FOR CHINA.

The easiest and cheapest cement to prepare for uniting broken edges of glass and china is made by taking two ounces of pulverized white gum shellac and half an ounce of gum mastic. Soak them together in a couple of ounces of sulphuric ether, and add half a pint of alcohol. After the whole is dissolved the preparation is ready for use. Heat the edges of the article to be mended, put on the cement with a brush, hold firmly till the cement has set, lay the article away for a week and it will break anywhere else than in the mended place.

A CEMENT FILLING MATERIAL.

Dr. Seikel, of San Francisco, makes a cement as follows:— Chemically pure zinc is made with a portion of oxide of zinc and oxidized by keeping it at a white heat for from six to ten hours. Then add phosphate of aluminum until the mixture is of the consistency of putty. Bake until it is fully fused and looks like porcelain; then pulverize finely. This powder is to be used with a fluid composed of aluminum added to chemically pure glacial phosphoric acid and boiled down to the consistency of syrup.

CEMENT FOR IVORY.

Moisten a small quantity of very finely powdered quicklime with white of egg to form a paste. Use at once, clamp parts firmly together and leave for twenty-four hours. Use as little cement as possible.

LIQUID FOR MIXING CEMENTS.

Dental Weekly, March.

Metaphosphoric acid glacial in sticks, 1 ounce, dissolved in aqua dist. 3 ounces. Cork the bottle firmly, and let it stand for twenty-four hours. Then put the liquid in an evaporating dish and let it boil over a medium gas-jet for about five or six minutes; fill in a well corked bottle, and when cooled down it is ready for use. This liquid will always remain clear.

CEMENT FOR MOTHER OF PEARL.

Diet. Bul. Pharmacy.

Isinglass in thin sheets	4 dr.
Mastic	2 dr.
Ammonium chloride, powdered	1 dr.
Alcohol	3½ oz.
Water	4 oz.

Steep the isinglass in the water for one day, and then dissolve by aid of a gentle heat, add 16 drachms of alcohol, pass through a cloth strainer, and to the hot solution add, with constant stirring, the mastic, previously dissolved in 12 drachms of alcohol.

MIXING AND TINTING CEMENTS.

Dental Review, March.

In speaking on the subject of cements, Dr. Fernandez says he keeps on hand two colors of the powder only, the white and the gray, and produces the tints required by intermixing with either color finely pulverized jeweler's enamel of the shade required.

This jeweler's enamel powder is prepared as follows: A lump of the enamel is enclosed in a piece of strong cloth and cracked down into dust with a hammer. This dust is then placed in an agate stone mortar, clean water is added, and the dust ground into fine powder under water; next passed into an evaporating dish, dried by heat, and bottled ready for use. In this manner he prepares any color of enamel wished.

When filling crown cavities with oxyphosphate, burnish the enamel powder into the surface of the filling before it is perfectly hard, this prolongs their insolubility.

It is a mistake to mix the cement too thick or too thin, and the spatula used for the purpose should be gilt or nickel-plated and kept perfectly clean. Steel matrices should be avoided entirely. Use gold matrices exclusively in cement work.

CEMENT FOR CHINA.

British and Colonial Druggist.

Skimmed milk ..... ½ pint.
Vinegar ..... ½ pint.
Mix, and separate the curd; wash, and mix with
whites of ..... 5 eggs.
Litharge, the finest powder ..... 1 drachm.
Quicklime sufficient to form a paste.

RUBBER DAM CLAMPS.

Dominion Dental Journal.

To adjust the clamp painlessly, slip over the jaws a small piece of rubber tubing.

A CERVICAL CLAMP.

DR. L. C. BRYAN, BASIL, SWITZERLAND.

Dental Register, December.

It may be described as a bow clamp soldered to a spring cravat-holder. It is very easy to hold, as the fingers and thumb get a good grip of the roughened handle or ends. By pressing the back, the clamp can be made to slide up or down, so as to fasten it at the back. The front bow having been cut, it can be bent in all directions, so that it can be fitted to the most irregular cavity.

TREATMENT OF CICATRICES, PRESSURE AND FRICTION.

DR. DAVID WARE.

National Board of Health Magazine.

When scars are situated on exposd parts of the body they are very unsightly, and when of large size are often productive of much deformity because of the strong tendency of cicatricial tissue to contract powerfully for many months after the healing process has been completed.

By means of friction and pressure persistently conducted, as here directed, the red shining surfaces of scars may be made to resemble the texture of the surrounding skin. When portions of the scar project above the surface these may be smoothed down, and in extensive cicatrices when tendinous bands connect the scar with underlying muscles or even with the periosteum, they can be absorbed and the natural mobility of the parts restored; moreover, the contractile tendency of extensive cicatrices may be successfully resisted, and when deformity has already occurred because of such construction, it can always, at least measurably often, be quite removed by the same apparent simple means.

The treatment should be conducted as follows: If the scar be a small one, place the ends of two or three fingers on it, the hand being at an angle of thirty degrees with the surface; press firmly and vibrate the surface on the tissues beneath. The surface of the scar itself must not be subject to any friction; all the motion must be between the integument and deeper tissues.

The location of the vibratile motions and pressures should be changed every ten or fifteen seconds until the whole scar has been treated, if it be of moderate size; but if the cicatrix be large the margins only should be subjected to treatment at first; advances toward the center must be deferred until the nutrition of the margins has been decidedly improved.

Only a little treatment should be applied to any one spot at the same time, but the pressures and vibrations should be repeated ten to fifteen times every day, provided that pain and tenderness are not produced; when these are developed treatment must be suspended until they subside.

In the course of two or three weeks of such treatment the surfaces of such scars of moderate size become more mobile and will begin to form wrinkles like true skin when pressed from side to side.

The tenderness usually present will gradually subside, and the natural tactile sensibility will be at least measurably restored.

All the changes are due to improved nutrition consequent on better blood circulation, aided by the development of entirely new sets of blood-vessels in the parts. But no matter how successful this treatment may be in restoring the integument, hair will never grow in cicatricial tissue.

EXCELLENT CLEANSING FLUID.

Dental Office and Laboratory, September.

Chloroform	2 drachms.
Alcohol	½ ounce.
Liquid ammonia	2½ ounces.
Sal. soda	½ ounce.
Castile soap	2 ounces.

Cut the soap up fine and dissolve in one gallon of soft (or rain) water.

Dissolve the one-half ounce of sal. soda in as much soft water as is necessary to take it up, then add this in another bottle to the chloroform, alcohol, and ammonia. When the castile soap is entirely dissolved, add all these ingredients to it. Shake it up well and bottle it securely. It will keep for years. To remove spots from clothing or carpets, use the liquid on a sponge.

COAL OIL IN THE LABORATORY.

DR. H. H. BURCHARD, PHILADELPHIA.

Dental Cosmos. October.

Used freely on the oil stone, it keeps the latter fresh and clean. Used upon lathes, it removes all the gummy collections of old lubricants, and cleans journals and all other surfaces quite as

well or better than does lye. It will remove many of the discoloring accumulations from wood. Use it to soak old instruments, to remove rust.

THE CONTROL OF DAYLIGHT, AS RELATED TO THE CARE OF THE DENTIST'S EYE-SIGHT.

DR. L. VAN ORDEN, SAN FRANCISCO.

Pacific Stomatological Gazette, December.

Having made choice of location, are there any steps we can take to make the light useful to a high degree, and to avoid uncomfortable and even serious eye-strain? There would seem to be a number of principles that should always be kept in view. In the first place, it should be kept in mind that the skylight from above, and not a reflected light from a building across the street, is that which should be made use of. In narrow streets with very high buildings the lower floors are almost limited to reflected light, and are not adequate to dental needs. One is almost better off facing upon a court and using light from a large reflector set at an angle upon the window ledge. If a reflector has to be resorted to, one made of fine-fluted tin used in large lanterns gives the softest light obtainable from such a method. In making such a reflector, the tin should be protected from dampness by glass, well puttied, and the frame and back well jointed and made waterproof with paint. A pair of hinges and cords will permit accurate adjustment, and the result will be a flood of purely horizontal rays of light, making the mouth mirror a more than usual necessity.

Having disposed of light furnished by a reflector, it remains to be considered how daylight can be made to be most nearly skylight. An opaque roller-shade, working from the very bottom of the window and excluding all stray rays of light up to its upper margin is the desired means. One who has learned the value of this lower shade will scarcely exceed the bounds of reasonableness when he places it as second only to the appliances with which operations are performed. On one occasion the writer became afflicted with inflammation of the eyes and the consequent photophobia. Upon investigation it was noticed that during a certain portion of each

morning glaring rays of light were reflected from the brass signs and white awnings of a store situated two stories below upon the opposite side of the street. The substitution of an opaque shade for the light, transparent curtain which had been used merely to exclude the vision of passers-by quickly cured what threatened to be a serious affliction. The operating chair was at a late date moved to a room of smaller dimensions, and it was found that a strong reflected light was projected upon the ceiling and upon walls that approached rather close to the chair. This was found to be caused by large white awnings and the light color of the opposite building. Tearing down the partition relieved a part of the difficulty, but the ceiling and rear of the room were still flooded with light, and when an attempt was made to relax the muscles of accommodation of the eye, by occasionally looking away from the work, this end was baffled by the useless flood of light in all parts of the room. A secondary curtain was then resorted to, suspended from the ceiling and hanging just about over the patient's head, and working upon a roller. This was operated by a stick and hook, and could be brought into use at any moment without interfering in any degree with the operating light; and thus was secured a grateful relief to needlessly overtaxed eyes. Short portiéres, worked by rings and cords from the sides, might suit the fancy of some better and become an ornament to the room; or some permanent drapery—always opaque—might be placed in position. An artist of experience and judgment was consulted, who agreed that behind the easel no light was needed or possessed of much value. How much less value may it not possess for the dentist who, often in an unhealthy attitude, is obliged to rivet his eyes for protracted periods within the confines of the oral cavity. The amount of light needed it may be wise to decide upon. A fair-sized window, if of good height, will suffice for nearly all purposes; for the opaque lower shade, raised to various heights by excluding hurtful rays, by contrast makes the rays admitted more powerful. An upper shade can likewise be used at times to decided advantage, especially in operations upon the upper denture, where the front teeth cast a shadow by intercepting the very highest rays of light. Patients will sometimes express satisfaction upon first being seated in the chair, if these shades are used temporarily to relieve the glare from white clouds, buildings or awnings. If transparent shades are used to transmit the direct rays

of the sun, they should be supplemented by opaque shades, especially at the bottom, just as with the north light. When there are windows upon two sides of a room, all of which must be used, and a partition is not admissible, a portiére can be suspended on a rod or pole from near the ceiling to the floor, thus serving nicely the uses of a partition. If the operating window is a square bay, it is well to place the chair at its center and use the right and left sashes alternately, as the work is upon the right or left side of the mouth. There are but few occasions when all four lights are as good as a less number.

The writer uses a pentagon corner window, with a northwest exposure. The two lights behind the chair are never used except at noon to admit the sun's rays. They are made opaque by roller shades and portières beside, for no shades seem to be quite proof against direct sunlight. Outside awnings were once used with satisfaction, and prevented the excessive heat of the afternoon sun. Use is made of the middle one of these northern windows, occasionally using an additional one to the right or left, but never all three together, for then there would be confusing rays of light coming over one shoulder or the other. It is best to choose rather subdued tints for curtains, walls, and ceilings, the light olives being not too somber. The floor covering should be rather dark; the brown or uncolored linoleum is durable, cleanly, and pleasant.

A few pleasant pictures in an operating room will relieve the more darkened part, and if the clock is placed at some distance it will make an excuse for lengthening the range of vision, thus relieving the tensor apparatus of the lens and cornea. While in the open air, it is well to view objects and scenery in the distance. Dentists who have far and sightly views from their apartments are to be congratulated.

RESTORING RUBBER DAM AND CORRECTING ODOR.

Dominion Dental Journal, September.

Dr. D. E. Wiber says that a weak solution of ammonia water will restore old, weak rubber dam and also take away the rubber smell so offensive to dentist and patient.

HOLDING THE DAM ON TEETH.

DR. J. N. CROUSE, CHICAGO.

Dental Digest, February.

Sandarach varnish and spunk, for the purpose of holding the dam on teeth, is thus spoken of by the writer:

With the surface of the tooth absolutely clean and well dried, spunk can be made to stick and to hold the dam against almost any force that is ever applied. The varnish should always be quite thick, say as thick as stiff molasses, and two or more bottles should be prepared and ready for use, so if one is either too thick or too thin, the other may be just right, a very important item.

When the dam is to be secured to a last molar and you have stretched it over the tooth, your assistant should be ready with a flat, curved instrument, the length of the curve being such that when the shank rests against the grinding surface the end of the curve will be resting against the tooth very near the gum. It can readily be seen that with such an instrument your assistant can easily and surely hold the dam and keep it from slipping off while you are drying the surface, placing the smallest amount possible of the sandarach on the surface, and applying a bit of soft spunk. Make sure not to have any of the varnish on the spunk which comes in contact with the dam, nor on any part except that which comes in contact with the tooth. However, if the muscular force is very great, and the resistance is too much to be held by the varnish, substitute for it a little oxyphosphate of zinc, using the same precaution to have it adhere only to the surface of the tooth, which in either case must be clean and dry.

STOPPING HOLES IN RUBBER DAM.

DR. R. H. COOL, OAKLAND, CAL.

Pacific Coast Dentist, June.

A small piece of dam is shellacked and placed over the puncture. It will soon harden and stop the leak.

A piece of cotton shellacked and pressed in the hole will answer in many cases. The cement used for bicycle tires is recommended.

AID TO CUTTING RUBBER DAM.

Dr. F. T. Murless says wet the scissors before cutting the dam.

MOUNTING DISKS WITH CEMENT.

DR. T. F. CHUPEIN, PHILADELPHIA.

Dental Office and Laboratory, March.

The best way to mount disks and points for the dental engine is with phosphate cement. Mix this thin or to a creamy consistency. Drop a small quantity in the hole of the disk or point, and daub a little on the end of the mandrel. Place the mandrel point in the hole of the disk, and make it true by putting the shank of the mandrel through the disk setter. Let this remain until the cement gets perfectly hard, and you will find that the disk or point will never separate, which cannot be said of mounting these with gum shellac, as is generally done.

TO MAKE STEEL CROWN DIES.

DR. F. B. NORRIS, HELENA, MONT.

The Dental Journal.

Procure a piece of round steel, half-inch for molars, three-eighths for bicuspids. Cut into as many three inch pieces as you want dies. Each piece is then heated to a redness and one end driven into the crown die plate, which will give a steel cameo of the cusps and sulci complete. The dies are afterward placed in a vise and filed to any shape or size desired, being careful not to have the neck smaller than the crown. For either the steel or fusible metal dies a block of close-grained pine or spruce is all that is necessary for a counter. By driving the die into the end of the block you have as fine a counter as one would wish. A little oil placed in the counter will prevent the crown from sticking. The cusps of a seamless crown may be swaged with these dies.

ENGINE CORD.

DR. GEO. S. MARTIN.

Dominion Dental Journal, March.

An engine cord may be made at a cost of three or four cents from a pair of ordinary round twilled corset laces. Cut one of the brass tags off, and by means of the tag on the other lace telescope one lace end over the other one or two inches. Take the other ends, and, after measuring, cut off one to the proper length and proceed as with the other ends. The tags may be passed out through the sides and cut off when inserted far enough. A few stitches through the telescoped ends will hold them secure.

TO REPAIR GAS BAG.

Western Dental Journal, February.

Take a film of vulcanized rubber, coat the one side with chloroform, place it over the break and press it down for ten seconds, and the break is made whole.

MAGNIFYING GLASS AS AN AID TO OPERATING.

Dental Cosmos, November.

Dr. J. A. Libbey uses a double convex, hand magnifying glass as an aid in preparing cavities and introducing the fillings. The glass is held in the left hand and focused on the operation. He says repeated trials will have to be made before the use of the glass will be appreciated and the manner of holding it be acquired.

Dr. S. H. Guilford uses a jeweler's eyeglass, held with the fingers. Such glasses are made to focus at different distances.

Dr. Flagg adjusts a handle to the glass and holds it between his teeth, thus relieving his hand and keeping the focus.

SPRING OR CLASP GOLD.

Pure gold	16 parts.
Copper	4 parts.
Silver	4 parts.

GUTTA-PERCHA CANAL POINTS.

DR. GRANT MITCHELL, CANTON, OHIO.

Cut gutta-percha base plate into strips two and one half inches long, and in width corresponding to the thickness of the sheet. Lay them one by one upon a glass slab or other cool, smooth surface, and with a stiff cement spatula, slightly warmed, roll one end—drawing it out to as fine a point as desired.

Such points are less expensive, better quality, and decidedly easier to manipulate than the little, slippery stubs purchased.

MAKING GUTTA-PERCHA POINTS.

DR. A. E. MATTESON, CHICAGO.

Dental Review, August.

To make gutta-percha points for root filling, the writer uses the red base plate material; he cuts it lengthwise into strips the width of the thickness, thus making square rods. Taking a rod, he holds it over a lamp, gently twisting and drawing it out, as it heats. It is then cut into proper lengths.

GOLD CATCHER.

Items of Interest, May.

Dr. E. T. McKim says to catch the gold, in drilling out old fillings, take a piece of wire about as large as an ordinary lead pencil, and five inches in length, and bend slightly. Fasten it on to the rubber dam, after the dam is in place on the teeth, by taking hold of one corner of the dam about half an inch from the lower edge. Stretch the dam over one end of wire as though you intend to punch the wire through it; draw rubber dam tight over the other end of wire so as to make a pocket, and you have it.

TO PRESERVE GUTTA-PERCHA.

Keep it immersed in glycerine, in a wide mouth, stoppered jar.

HEADACHE.

Dr. E. C. Kirk says for uric acid headache, which he characterizes as one of those absolutely paralyzing and debilitating headaches, ten grains of bitartrate of lithium, taken dry, will, inside of twenty minutes, give relief.

ODOR OF IODOFORM.

The odor of iodoform in the office may be destroyed by burning a little coffee in the room.

EXPLORING INSTRUMENTS.

Dr. Mirriam says milliners' needles with the temper drawn, and placed into handles, make most excellent exploring instruments.

TO STERILIZE INSTRUMENTS.

DR. E. C. KIRK, PHILADELPHIA.

Dental Cosmos, November.

It has been shown by test and experience that the caustic alkalies, as well as their carbonates, possess marked germicidal properties. One of the most manageable and satisfactory agents of this class is liquor ammon. fort. Instruments soaked for a few minutes in a rather warm aqueous solution of ammonia are most beautifully cleansed thereby, without detriment to their polish or temper.

TEMPERING CUTTING INSTRUMENTS.

When tempering cutting instruments, an excavator for instance, begin heating the shaft first, and gradually carry the heat to the point. Let the edge be the last to heat.

SEPARATING LEAD FROM ZINC.

It is said this can be done, where the two metals are united, by making holes in sand, say with a file handle, melting the contaminated metals and pouring into the holes. The lead being the heavier sinks to bottom. A line of demarcation can be seen where the metals join.

LACQUER THE COLOR OF GOLD.

Scientific American.

Dissolve clear, light colored shellac in 95 per cent. alcohol, 1 ounce to a quart. Settle in a bottle for a day and pour off the clear top solution. Add a little alcoholic extract of saffron or dragon blood gum to color to suit. If too thick, dilute with proof alcohol.

IRON SPOONS FOR LADLES.

Iron spoons, such as used in kitchens, make excellent ladles for melting metals in the laboratory over a Bunsen burner. Have a spoon for each metal, and mark so as not to have it used for any other metal. Bend the point of the bowl for a pouring lip.

WIRE NAILS FOR MANDRELS.

Dr. Fogg, of Barnesville, Ga., makes use of wire nails as mandrels for carrying disks. These are in reach of any dentist. The disk may be cemented on the head of the nail or attached with shellac. They are trued by revolving them rapidly in the engine before the cement or shellac is hard.

TO MAKE DISK MANDRELS OF OLD BURS.

DR. B. H. CATCHING, ATLANTA, GA.

Flow soft solder, type, or babbitt metal on the bur end, making it a little larger than the shank; with a file dress it down to the exact size of the shank. The easiest way to flow the metal on is to make a ladle of a sewing-thimble or a cartridge shell. Melt it full of metal, dip the bur in and then dip it in water; re-dip it alternately until the required amount of metal is added, then file to the size of the shank. On these mandrels it is easy to mount corundum disks with shellac. If necessary, enough metal can be put on and turned to a shoulder, by placing the mandrel in the hand piece, revolving the engine, and with a file cut the shoulder as desired.

DALTON'S FUSIBLE METAL.

Bismuth	10½ parts.
Lead	5 "
Tin	3 "

Melting point, 197° F.

NEWTON'S FUSIBLE METAL.

Bismuth	8 parts.
Lead	5 "
Tin	3 "

Melting point, 202° F.

SPONGE HOLDER WITH MIRROR.

DR. L. C. BRYAN, BASIL, SWITZERLAND.

Dental Register, December.

This invention consists of a round mirror soldered to the outside of one point of a pair of pliers. With the pliers a piece of wet sponge is held on the filling or tooth to be ground, and when desired to look at the work with the mirror, it can be done by sim-

ply turning the pliers over and thus exposing the face of the mirror. It is used to moisten the corundum or any other grinding wheel, and at the same time protects the tongue and lips. It catches the gold that falls when polishing and keeps the corundum cold, sharp, and clean. White's moistening pads or any other moisture holder may be used with it. Sponges are preferable, as they do not catch in the grinding-wheels. Sponges or pads should be kept ready moist in a dish of water, and after use should be preserved in a dish to burn and recover the gold scraps.

After grinding down and burnishing the filling, dip the wet sponge or pad into the polishing powder desired and convey it to the filling and buff, wood wheel or point to be used.

MIRROR WITH SHELL-SHAPED RIM.

DR. L. C. BRYAN, BASIL, SWITZERLAND.

Dental Register, December.

This is very useful when filling the upper teeth, as it conveys the filling material to the cavity and catches all the fragments which may drop during the operation.

It throws light upon the tooth and reflects the operation and the cavity at the same time. Moreover, it is useful in catching chips and old fillings or any other small object removed from the teeth or cavities.

CARE OF THE NAILS.

Boston Journal of Health.

Very few people know how to properly care for the nails. In cleansing them a sharp knife ought never to be employed, but between the ends of the nails and the fingers the space should be filled with soap, and then removed by brushing with the so-called nail brush. Many improperly cut away that part of the flesh which grows over the nail from the bottom; but it should be simply pressed backward, and sufficiently to show the white part,

considered by some to be a mark of beauty. If the flesh is adherent to the nail, the operation may be facilitated by passing the sharp point of a knife underneath the fold of flesh and separating it from its attachments. With this done, it can be pushed back more readily. Scissors should never be used to cut the nails; that should be done only with a sharp penknife.

TO MAKE PLATINUM GOLD PLATE.

DR. J. G. TEMPLETON, PITTSBURG.

Dental Review, December.

To make platinum and gold plate, melt with blowpipe pure gold on a piece of platinum and roll to the desired thickness; the result will be as good as any you can buy.

OPENING PYROZONE TUBES.

The manufacturers say, if the tubes of the 25 per cent. are not opened within thirty days, they should be returned to them. The following directions are given for opening them:

After immersing them in cold water, take a three-cornered file, wrap a towel around the tube, and file about half way through at the point just below the bulb where the tube is sealed. Do not file clean across it, but only half way, and then, with a sharp tap with the file, knock the end off.

Some one has suggested the way of placing the tube first in cold water, then wrap it in a towel and cut the end with a corundum wheel. It is well to take precaution in opening them.

SILVER PROBES.

Dental Review, April.

Small probes are very useful in tracing pus fissures, etc. Dr. Brophy uses fine silver wire with a bulb on the end, of silver solder.

TO RESOLDER OLD SOLDERING.

DR. J. D. PATTERSON, KANSAS CITY, MO.

Western Dental Journal, July.

With the same carat gold, amalgamate the surface of the solder to be used, which will then flow very readily. The mercury will be driven off in the heating.

VULCANITE SCRAPERS.

Excellent vulcanite scrapers can be made of old flat files, by drawing the temper, bending to shape, grinding to edge and re-tempering.

TO REPLATE CLAMPS, ETC.

DR. W. J. MILLER, CHICAGO.

Items of Interest, December.

To brighten and make nearly as nice as new, rubber-dam clamps that have lost the plating and become rusty and discolored, dip them in a bath of sulphuric acid, then remove, and with brush-wheel and pumice make bright. Wash clean and dip in a strong solution of cyanide of potassium, and they are ready for the plating solution. This is made as follows: Put in a six ounce bottle about ten grains of nitrate of silver and four ounces of soft water. When thoroughly dissolved, add strong solution of common salt till the curdled appearance given by the salt ceases to form. When settled, use the clear portion for a battery. To make a simple and inexpensive battery, put the liquid in a glass tumbler; having two narrow strips of zinc, one to hook on to the edge of the tumbler, the other to hold the clamp or article to be plated in solution. On the upper end or hook of the zinc strip to hook on the side of the tumbler, soft-solder a piece of copper wire long enough to reach across tumbler and down half way the opposite side; and on the other end of the wire solder a ten cent piece of silver for an anode. Put sufficient plating solution in the tumbler to cover the article to be

plated, leaving them in for fifteen or twenty minutes, or till nicely covered. Now remove, and with brush-wheel brighten it. Repeat as many times as you wish; each time gives an extra plating. Other uses will be suggested, for nothing is more attractive in a dental office than bright, clean instruments.

IODINE STAINS—TO REMOVE.

Apply strong ammonia to remove iodine stains from cloth or the skin.

TO REMOVE BLOOD STAINS FROM TOWELS.

The Zentralblatt f. Gyn. states that the best way to remove blood stains from towels, etc., is to soak them in warm water to which a teaspoonful of tartaric acid has been added. No soap is needed.

TO REMOVE OIL CASSIA STAIN FROM TEETH.

Dental Review, September.

Ozonized oil of turpentine will dissolve the stains produced by the oil of cassia when it is left too long in a tooth. Wash the cavity afterwards with chloroform and repeat if necessary.

GOLD SOLDERS.

DR. J. G. TEMPLETON, PITTSBURG.

Dental Review, December.

Take a United States $5.00 gold piece, 20 grains coin silver, 10 grains pure copper, 6 grains English toilet pins; melt the silver and copper together first; after melting this and the gold together, add the pins, flow into an ingot and roll, cut it into small pieces and melt again if it should not roll well first time; this will give a

solder a little more than 19 carats fine, and flows nicely on coin gold, being the same color.

This we call No. 1. Now take of

No. 1	89 grs.
Coin silver	7 grs.
Pure copper	4 grs.

Melt together and roll, and we have a second grade which we call No. 2, and which will flow on No. 1.

To make a still lower grade take:

6 dwt. pure gold.
2 dwt. copper.
1 dwt. fine silver.

And you have a 16 carat solder. In his practice only Nos. 1 and 2 are used, made according to the formulas given above.

GOLD SOLDERS.

British Journal Dental Science.

17 CARAT.

Pure Gold	20	parts.
" Silver	3	"
" Copper	4	"
" Zinc	1	"

16 CARAT.

Pure Gold	16	parts.
" Silver	3	"
" Copper	4	"
" Zinc	1	"

15 CARAT.

Pure Gold	12	parts.
" Silver	3	"
" Copper	4	"
" Zinc	1	"

14 CARAT.

Pure Gold	30	parts.
" Silver	8	"
" Brass	7	"

SILVER SOLDER.

Pure Silver	10 parts.
" Brass	2½ "
" Zinc	1½ "

When making solder, the gold, silver, and copper should be melted first, using a clean fire-clay crucible.

When in a state of fusion the remaining ingredient, zinc, is added, but to prevent immediate volatilization when it comes in contact with the molten metal, it should be wrapped up in a little gold foil, and inserted into the crucible by means of a pair of tongs; the contents of the pot should then be immediately stirred with a tobacco pipe stem, previously made warm, so as to thoroughly mix the zinc with the other metals.

TREATMENT OF HYPODERMIC SYRINGE.

Medical Record.

Draw out the piston-rod, immerse the syringe in water, then push the piston home, when the chamber back of the piston-head will be found filled with water which entered at the orifice through which the rod plays. This will not leak out, and will keep the syringe in prime order, ready for any emergency.

HOME-MADE HOT AIR SYRINGE.

DR. C. H. LOVEJOY, ST. PAUL, MINN.

Items of Interest, March.

Procure a small brass blow-pipe, one with a bulb, and which separates near bulb; to this attach a double bulbed air pump for continuous blast, and you have a hot air syringe as good for all uses as can be bought.

BRACKET TABLE COVER.

Items of Interest, June.

Dr. Chance suggests the use of blotting paper, which can be had in large sheets and cut to fit.

[There is nothing cleaner than glass, under which is placed a sheet of white paper.—ED. COMPENDIUM.]

COVER FOR WORK-TABLE.

DR. W. H. STEELE, FOREST CITY, IA.

Ohio Dental Journal, June.

The composition rubber strips, used by stamp-makers for covering the wood face of the mount before putting on the die, make the very best kind of pads for the laboratory finishing table. It looks neat, makes the work of filing and scraping almost noiseless; finished work will not get marred or scratched by coming in contact with it; the piece of work is not slipping around on the bench, but is easily held in place; gold trimmings and fillings are readily seen on it, and easily removed. This material comes in rolls of different widths, sells at 60 cents a pound, and can be got of any rubber dealer.

A TEST FOR VASELINE.

Union Pharmaceutique.

Petroleum jellies are sometimes adulterated with a certain quantity of animal or vegetable fats. These can, of course, easily be detected by the process of saponification, but this is somewhat tedious. A simple test is the following: Five drops of a saturated solution of potassium permanganate in distilled water are mixed in a mortar with five grams of the jelly. If there is no foreign oil present, the color remains; if there is any vegetable or animal oil, the permanganate is reduced, and the color changed to a dirty brown. A roughly quantitative determination can be made if the mass is gradually treated with solution of permanganate until the red color is not discharged.

LATHE WHEEL WETTER.

Make a hole near the closed end of a rubber dam can, solder into this hole a tube or spout, insert into the spout a loose wick made of cotton wrapping twine, let it project from the spout one inch; suspend the can to a wire entered into a hole in the lathe table and bent so as to have the end of the wick over the wheel. Fill with water, which will drip from the wick onto the wheel. The wire support may be planted into a lead base, and be movable.

WEIGHT EQUIVALENTS.

To convert grains into grams, multiply by 0.065; to convert grams into grains, multiply by 15.5; to convert drachms into grams, multiply by 3.9; to convert ounces (avoir.) into grams, multiply by 28.4; to convert pounds into grams multiply by 453.6.

POLISHING WHEELS.

DR. J. E. DAVIS, COLUMBUS, O.

Items of Interest, July.

Splendid polishing wheels and cones can be made at a cost of less than one cent each, by getting a piece of heavy packing, made of rubber and ducking, at a steam fitters; with a sharp knife cut in sizes to suit, and finish by turning down in a lathe. Sole leather can be used in the same way.

OILED WEDGES.

Dr. A. W. Harlan says: When using a wooden wedge, dip it in oil of wintergreen and it will not slip out.

C. E. K., in Dental Office and Laboratory, says blacken the wedges with a lead pencil, to make them enter easily.

SCIENCE IN DENTISTRY

FOR THE YEAR.

AN INVESTIGATION OF THE PHYSICAL CHARACTERS OF THE HUMAN TEETH IN RELATION TO THEIR DISEASES AND TO PRACTICAL DENTAL OPERATIONS, TOGETHER WITH THE PHYSICAL CHARACTERS OF FILLING MATERIALS.

G. V. BLACK, M. D., D. D. S., D. S. C., JACKSONVILLE, ILL.

Dental Cosmos, May to September. Reviewed by H. H. Burchard, M.D., D.D.S., Philadelphia.

After rapidly reviewing the succession of theories regarding dental caries, which preceded the demonstrations of Miller, the writer notes a common idea held in explanation of the rapid progress of caries in teeth heretofore resistant; that there is some intrinsic alteration in the substance of the tooth itself; that there is a softening of the dentine other than that arising through external causes. The possible occurrence of such a softening is the first step of the series of investigations. The position of the teeth in the scale of vital and nutritive distribution, together with the proof that caries is a disease beginning from the exterior, militates, primarily, against the theory of intrinsic alteration. The objects of the investigations are twofold; first, to determine accurately what may be the differences of composition of teeth and in their density, and what relations these bear to the occurrence of disease in and about the teeth.

"The object of the investigations as to the relations between the physical strength of the teeth and of filling materials, together with the force of the jaws in occlusion, is to find laws or factors as will enable us to more perfectly adapt filling materials, so as to afford the needed resistance to the stress of mastication and attendant accidents." The questions to be determined are: What have variations of density, if they exist, to do with dental diseases?

What relation does density bear to the strength of the teeth? The relations of the strength of teeth with that of filling materials, and what the combined strength relations of these to the forces of occlusion during mastication.

These investigations involved the construction of apparatus and the devising of methods of the utmost accuracy to measure and weigh the tissues and their constituents. An imposing array of experiments, upon material gathered and tabulated with precision, were performed to furnish data which were carefully arranged in tables, from which the author has drawn his own deductions and invites all other observers to their own study of them.

The experiments revealed the fact that the dentine of the crown of a tooth is generally heavier in proportion to its bulk, is more dense, than the dentine of the root, this difference in relative density averaging about $_{1000}^{25}$ of a volume. In the large proportion of cases the dentine becomes less dense progressively from the occlusal portion of the crown to the end of the root.

The site of section of the specimens tested was at the level of the gingival margin. The points first determined were, first, the specific gravity; second, percentage of water; third, the percentage of lime salts; fourth, the percentage of organic matter; fifth, the strength and elasticity of the dentine.

By means of special apparatus and methods of extreme delicacy, teeth representing all of the peculiarities of form, and structure, and pathological condition, and according to ages, temperaments, nationality, etc., were tested in great numbers.

The tables exhibit a close similarity of the specific gravities of the teeth, the range being only $_{1000}^{97}$ of a volume in one hundred and eleven persons, including all errors. But there is a difference between the individual teeth of the same person, two-thirds as great as in the differences between the teeth of the one hundred and eleven cases. While in the main the percentage of lime salts agrees with the specific gravity, there are many cases in which they seem not to correspond. Dr. Black draws the conclusion that the specific gravity of a tooth does not depend wholly on the weight of lime salts it may contain. The average percentage of lime salts is about 63.54 per cent. Ivory, or dentine, from the tusk of the elephant gives an average of 47.06 per cent. of lime salts, and yet the difference of hardness does not seem to be notable. The range of

percentage in lime salts of the human teeth does not seem to be sufficiently great to be of much consequence as to hardness or softness, and yet it has some effect. The free water is an essential element of the tooth. It is found to be variable—greater in youth, diminishing with age. The lighter teeth contain more water than the heavier. The general average is about 11 per cent. Teeth that have lost their pulps are very variable in the amount of water. Those that have become darkened generally contain more than the normal amount.

The average percentage of organic matter is 25.36 per cent. This diminishes as the density increases, but not with perfect regularity. I have come to regard the organic matrix of the tooth as much more important than I had formerly considered it. The condition of the organic matrix seems to have much to do with the strength of the tooth, and is a matter which needs further investigation.

There is practically a continuous increase in the density of the teeth, and in the percentage of lime salts they contain, from youth to old age. The average S. G. beginning with eleven years, 2.066, and ending with the average of 2.109 at sixty-three years.

The increase of lime salts though less regular follows the same rule, beginning with 62.26 per cent. for the average age of eleven years, and it increases to an average of 64.56 per cent. for the average of sixty-three years.

The advance of density seems to be checked somewhat in the period between twenty and forty. During the same period the percentage of lime salts shows no increase.

He concludes, after experiments, that there is no diminution of the density or of the percentage of lime salts occurring in the teeth of women during the period of child-bearing, on account of that fact.

After testing teeth lost through peridental disease and finding the increase of density infinitesimal, he concludes that "the hypothesis that diseases of the peridental membrane are more liable to occur in persons who have dense teeth is not maintained."

Tests of series of carious and non-carious teeth lead to this inference: "These classifications therefore show conclusively that neither the density of the teeth nor the percentage of lime salts they contain has anything to do with the liability of the teeth to suffer

from caries." The delusiveness of the clinical evidence adduced to prove alterations of the amount of lime salts present in teeth according to altered vital states is lucidly exposed.

THE STRENGTH OF DENTINE.

It is noticed that dentine blocks were considerably compressed before they crushed or that they exhibited considerable elasticity. The average stress required to crush blocks of dentine $\frac{8}{100}$ inches square is 238 pounds the block compressed 2.09 per cent. of its thickness by a stress of 100 pounds; with 150 pounds it is compressed 4.03 per cent of its thickness. With a stress of 100 to 150 pounds, upon blocks from living teeth, there is perfect recovery of form, and the dentine is uninjured. If compressed too near its crushing point, it is permanently injured. Upon the whole, dentine from teeth containing the least lime salts, presented the greatest power of return to the normal after compression. The crushing stress is not directly dependent on the density or on the percentage of lime salts, but seems rather to be dependent on the condition of the organic matrix.

Dentine that showed a clear translucence could always be depended upon to show a high crushing stress, no matter whether its density and percentage of lime salts was high or low. On the other hand, dentine that under like conditions showed an opaque appearance and a dead color would break with a correspondingly slight stress. Nearly all of the high-crushing stresses will be found in comparatively young people.

It seems that some importance may attach to the co-relation of the organic matrix and lime salts, a matter that I have not had the time to follow out in detail, so as to understand its meaning.

PULPLESS TEETH.

Pulpless teeth seem to lose strength if they remain long with open pulp-chambers.

The majority of pulpless teeth coming into my hands were of fairly bright color, indicating that the pulp was recently dead. These presented no especial differences in physical character from those with the pulp-tissue intact. But those muddy in color, especially if markedly discolored, showed constantly an additional percentage of water; and the few of which I had the opportunity

to test the crushing stress, broke below 200 pounds, showing a marked loss of strength.

I have made diligent search to find whether or not teeth from which the pulp had been removed, and the canals and pulp-chamber filled without admitting the fluids of the mouth, were subject to a similar deterioration of strength. It is now well known that teeth treated in this way retain their color almost perfectly; and from my observation of the relation of color to the strength of the teeth, I am prepared to entertain the supposition that they retain their strength also.

STRENGTH OF DENTINE HAVING LATERAL SUPPORT.

An effort was made to determine the effect of lateral support in increasing resistance. Blocks of teeth were excavated so that a ledge of dentine was left supported on three sides; but few of the slabs broke under a stress of 250 pounds; the compression or elasticity shown was usually from 5 per cent. to 7 per cent. In comparison with the best of granite, dentine is one-third the stronger. That dentine will generally sustain this stress (350 pounds) is certainly sufficient for us as dentists to give full confidence in its sustaining power to meet all our needs in filling teeth.

STRENGTH OF ENAMEL.

The enamel of the teeth shows less strength than the dentine. Indeed, taken alone it will sustain but little stress.

No matter how these were cut (as to direction of the enamel rods), or how the stress was applied, the crystals, or enamel rods, would begin to split off with very light stress comparatively, and the whole block would collapse at from thirty to seventy-five pounds. The results were so extremely irregular that a capitulation would give no correct view of it.

Trial of the enamel in position gave much better results than the blocks.

Stress applied in this way was generally borne without injury up to one hundred pounds; but when increased much beyond that point the enamel usually began to chip away, the superficial portions usually breaking first, and the deeper portions later as the stress was increased.

The difference seen when a cushion of soft gold (as pure gold

plate) was placed between the steel point and the enamel was quite remarkable. When cushioned with two thicknesses of No. 28 pure gold plate, the enamel of living teeth would generally bear two hundred pounds pressure before chipping began.

STRENGTH OF TEETH, AND CARIES.

In comparing the crushing stresses of the teeth with their tendency to caries, the result seems to be that no relation whatever exists. Teeth classed as bad seem as likely to be strong teeth as those classed as good. Some of the strongest specimens of dentine have been taken from teeth that were deeply decayed.

Examination of the density of the percentage of lime salts and of the strength of the teeth, that are certainly reasonably accurate and include a sufficient number upon which to base trustworthy judgment, has shown that neither the density nor the percentage of lime salts, nor the strength, is in any degree a factor in predisposing the teeth to caries, or in hindering its inception or progress.

With this view of the case, a strong disposition to caries of the teeth becomes as truly a dyscrasia as gout or rheumatism.

Again, every dentist of long and careful observation has not only seen persons immune from caries of the teeth, but has seen persons, whose teeth decayed badly at one time, become apparently immune at some after time. But the conception that some power or influence is acting, through the medium of the oral fluids, to produce the differences is forced upon us by the consideration of all the facts presented.

THE FORCE EXERTED IN THE CLOSING OF THE JAWS.

Before proceeding to the study of the physical characters of filling materials, it is necessary to determine the stress to which they will be subjected in the human mouth.

For the measuring of this force Dr. Black invented an instrument which he called a gnathodynamometer—literally a measurer of the force of the jaws.

Generally, persons biting on the gnathodynamometer, and endeavoring to exert their full power, stop because it hurts their teeth, and not because they have exerted the full strength of their muscles. The condition of the peridental membranes seems to be the controlling factor rather than muscular strength. The instru-

ment, then, tests the condition of these membranes to bear heavy stress, and is probably dependent upon the habits of the person, or upon the use to which they are habitually subjected in the mastication of food. A person who habitually crushes down on anything offered as food, hard or soft, thinking nothing of it, will accustom the membranes of his teeth to heavy stress. The person who does his or her chewing with the least possible effort will not accustom the membranes of the teeth to a greater stress than the medium of foods require, and will often find beefsteak tough. That the pain felt when biting on the gnathodynamometer is in the membranes, and not in the teeth themselves, seems very clear after a careful study of it. It seems that teeth in which the dentine alone is sensitive bear stress as well as perfectly healthy teeth, but a little affection of the peridental membrane destroys, for the time, the use of the tooth.

Many porcelain crowns, that are much too frail to bear the stress usually used by the persons wearing them, continue to stand because the condition of the peridental membranes of the roots is such that the person almost unconsciously avoids their use, except on the softest of foods. Also, many fillings stand only because they are not subjected to heavy stress. On upper plates, with natural teeth below, forty pounds has been exerted in a few cases; and Dr. G. B. Cary, of Perry, Ill., a dentist, made the remarkable record of eighty pounds upon artificial teeth above and natural teeth below. But with all allowance for this, these trials show them to be sadly deficient in masticating power as compared with the natural organs.

The tests with this instrument show that, while the teeth may be injured or fractured by biting upon hard substances like pebbles, if substances are interposed which may be even slightly indented by the cusps of the teeth, and in this way increase the area of enamel upon which the stress is supported, no exertion of the muscles can injure a tooth. To measure the amount of force necessary to crush articles of food, Dr. Black devised an instrument which he calls a phagodynamometer, (a measurer of the force in eating); it is ingeniously modeled to represent the mechanical crushing of food between the molars of man.

The principal articles of food tested were tender meats. Beef-

steak crushed at 40–45 pounds; mutton chops, 35–40 pounds; broiled ham, 45–60 pounds.

In the study of the motions employed, it was found that in the mastication of meats persons with fairly good teeth used the direct up and down motion exclusively. Many of the crusts from ordinary baker's bread, when subjected to stress between the molar teeth, could not be cut through with a stress of 250 pounds. They were readily broken up under a much lighter stress, combined with a little lateral motion when moistened with the secretions. Tables and lists of crushing stresses of many articles of food are given.

PHYSICAL PROPERTIES OF AMALGAMS.

In testing the strength of dental amalgams the author employs a binary alloy of silver and tin as a basis. The physical properties observed are contraction and expansion, together with an unsuspected property which is termed "flow." It is the peculiar property of yielding to successive applications of the same amount of force, clearly distinguishing it from the flow of metals such as steel, which flow a definite amount under a given stress, after which successive applications of the same amount of stress produce no alteration.

Amalgams made of an alloy of 65 per cent. silver and 35 per cent. tin apparently neither contract nor expand in setting. An increase of the ratio of silver causes the amalgam to expand in setting. A diminution below 60 per cent. causes contraction.

Amalgam made with precipitates of the metals of the same ratio, and mechanically mixed, gives different results from where the same metals are united in alloy. The addition of any third metal, except copper, immediately increases the contraction of the amalgam and its flow. The addition of copper five per cent. increases the rigidity of the amalgam, decreases its flow, and increases its crushing stress.

The crushing stress of amalgams ranges from 190 pounds (an amalgam not in use) to 350 pounds. The average crushing stress of commercial amalgams in present use is from 250 to 280 pounds.

Spheroiding is found to be a fallacious deduction due to the errors of clinical observation, the appearance called spheroiding being in reality due to the expansion or peculiar contraction of the amalgam. Mixing the amalgam in a mortar is found to give a

weaker product than when mixed in the hand. Packed by means of burnishers, the product is weaker than when packed under a steady and heavy pressure. The best results were obtained by packing in such a manner as to secure a uniform distribution of the constituents.

The composition of the alloy and the method of mixing and packing the amalgam influence the form change more than does the ratio of mercury present. Any form of violence, such as squeezing between heavy pliers, appears to weaken an amalgam. The best results were obtained by mixing the alloy and mercury in the hand, wringing out the mass through muslin, discarding the soft ends and packing with heavy, continuous pressure, and cutting away the soft surface of amalgam as it formed.

The contraction form was found to be similar to that of a disk of soap in drying—expansion similar to the bulging of ice from a tube in which water has been inclosed. No color tests were made.

The instruments employed in the tests were of such precision and methods were of such accuracy as to exclude all sources of error arising through faulty measurements.

Copper amalgam was found to be devoid of the property called flow. Its form remains unchanged until the force applied reaches the crushing stress, when the amalgam flies to pieces. Copper amalgams neither shrink nor expand in setting. The strongest specimens were those manipulated in the original buttons, squeezing out the excess of mercury. The residue produced weaker products, when reworked, than the first. By wringing out the excess of mercury from a residue and adding more mercury, an amalgam was formed which, when set, could be crushed with foil pliers. The crushing stress of the strongest specimens was over three hundred pounds.

It is concluded that the power of the material in the arrest of caries is in its physical properties (non-contraction, non-flowing), and not in any chemical or disinfectant property of the copper or its salts.

EXAMINATION OF GOLD.

Melted foiled scraps, cast in bars in ingot moulds, the ingots were found to have S. G. of from 19.1 to 19.3. The differences of density seemed to be caused by the differences in temperature at

which the metal was poured, together with differences of temperature of the ingot mould. Differences were also noted between the upper and lower ends of the bars.

Small cylinders of cast gold, S. G. 19.2, when placed under stress, were found to shorten; $\frac{1}{10}''$ cross section; under 200 pounds, they gave an average shortening of 4.37 per cent.; under 300 pounds, an average of 11.21 per cent. With increase of specific gravity of the blocks, there was a diminution of shortening. S. G. 19.25, under 200 pounds, gave an average shortening of 2.58 per cent.; under 300 pounds, 8.92 per cent. Hammered gold, S. G. 19.3, the average shortenings were 0.48 per cent. and 1.98 per cent. The same pieces, annealed, were shortened 6.17 per cent. and 12.70 per cent. These several specimens represent, theoretically, perfect fillings of an average size.

Gold fillings made in matrices of precisely-measured size, and under the usual and extraordinary methods and forces which different operators may apply, showed wide variations in the S. G. of the fillings, of the percentage of air spaces they contained, and in their response to physical tests. Many of the variations were clearly traceable to the personal equation.

In the exhibit fillings will be found that gave great resistance to compression—fillings which were very hard, but which fell much below the maximum S. G. In these, while the gold was made hard by malleting, there were many nooks and crannies which were not filled; the adaptation was imperfect. To make sufficiently dense fillings, a certain amount of force must be employed, but it is not necessarily very great.

In the study of the fillings presented it will be noticed that those made of non-cohesive gold are much less dense than those made of cohesive gold.

A careful comparison of the strength of the fillings shown in the tables, with the force exerted in the closure of the teeth, will show that many fillings have not strength enough to stand continuously where they are supported by but three walls. In reasonably favorable cases gold fillings should be made to stand indefinitely. The teeth are strong enough, and the gold can be made strong enough, and perfectly adapted to walls and margins. Faulty methods in the preparation of cavities is a very large ele-

ment in the failure of fillings. When stress is brought to bear upon fillings in the chewing of food, it is in turn borne by some portion or portions of the walls of the cavity, generally by that portion of the wall which is perpendicular to the line of stress. In proximate cavities in which there is the greatest difficulty in the support of fillings, if a seat be cut in the occlusal portion of the crown to support a large portion of the stress, we will hear of less difficulty in making proximate fillings stand. However convenient fits and grooves may be in starting and building fillings, the idea that they are effective in sustaining the filling should be forever abandoned. Proximate fillings are safely anchored only when the cavity is formed to give a seat to a filling sufficiently broad and flat for the gold condensed upon it to support even the extraordinary stresses of mastication. When this cannot be done at the gingival wall (and it is rare that it can) an additional seat in the occlusal portion of the crown should be added.

Many fillings fail by movement of the filling as a whole, from the stress applied, even when such fillings are perfectly adapted to walls and margins. Really, gold is the king of filling material, and yet to avail ourselves fully of its good qualities requires a clear view of its physical properties and a close apprehension of the forces at play in the process of mastication.

Dr. Black's deductions are embraced in these

CONCLUSIONS.

From the facts developed in this investigation, it seems that the following conclusions may be summarized:

The teeth are strongest in youth and early adult age, diminishing somewhat in strength with advancing age.

Teeth that have lost their pulps and have become discolored lose strength in a marked degree, apparently from deterioration of the organic matrix.

Teeth that have become badly worn from mastication, and in which the pulps become so much calcified as to cut off the nutrition of the crown portions of the dentine, lose strength, apparently from deterioration of the organic matrix.

Teeth of old people, and especially those in which much calcifications of the pulps occur, deteriorate in strength.

There is no basis for the supposition that the teeth of chil-

dren under the age of twelve years are too soft to receive metallic fillings.

Differences in density or in the percentage of lime-salts in the teeth is not the controlling factor in the strength of the teeth, nor their hardness, this seeming to depend upon the condition of the organic matrix.

Differences in the strength of the teeth have no influence as to their liability to caries. Differences in the density, or in the percentage of lime-salts in the teeth, have no influence as to their liability to caries.

The active cause of caries is a thing apart from the teeth themselves acting upon them from without, and, from a consideration of the facts thus far developed, the logical inference is, that the cause of the differences in the liability of individuals to caries of the teeth is something in the constitution, operating through the oral fluids, and acting upon the active cause of caries, hindering or intensifying its effects.

Caries of the teeth is not dependent upon any condition of the tissues of the teeth, but on conditions of their environment.

Imperfections of the teeth, such as pits, fissures, rough or uneven surfaces, and bad forms of interproximate contact, are causes of caries only in the sense of giving opportunity for the action of the causes that induce caries.

The objects to be attained in filling teeth are the perfect exclusion of the causes of caries from the tissues by sealing the cavity, and securing such form as will prevent lodgments of débris about the margins of the filling, and thus prevent the further action of the cause of caries.

There is no basis for the supposition that some teeth are too soft, or too poorly calcified, to bear filling with gold or other metal in use for that purpose, since all are found to be abundantly strong.

There is no basis for the selection and adaptation of filling materials to soft teeth, hard teeth, frail teeth (in structure), or poorly calcified teeth. What basis there may be in the conditions surrounding the teeth for the selection and adaptation of filling materials must be left to future developments to discover.

With our present knowledge, the only basis for the selection and adaptation of filling materials to classes of cases is the individual operator's judgment as to which he can so manipulate as to

make the most perfect filling, considering the circumstances, his own skill, and the durability of materials.

There is no basis for the supposition that calcic inflammation of the peridental membranes or phagedenic pericementitis (so-called pyorrhea) attacks persons who have dense teeth in preference to those whose teeth are less dense.

There is no basis for the treatment of pregnant women medicinally with the view of furnishing lime-salts to prevent the softening of their teeth, or with the view of producing better calcified teeth in their offspring.

[The reviewer desires to comment upon the omission of the important element of the anatomical organization of the teeth as a great factor in their intrinsic resistance to the progress of caries. Again, upon the omission of experimenting with amalgams as chemical bodies.—H. H. B.]

AMALGAMS AS CHEMICAL COMPOUNDS.

HENRY H. BURCHARD, M. D., D. D. S., PHILADELPHIA.

Dental Cosmos, December, 1895.

In examining Dr. Black's tables and data with a view to discovering chemical reasons for some of the phenomena observed relative to amalgams, the opinion is advanced that specimens of copper amalgam, which exhibit a wasting of their surfaces, do not have the metals in actual chemical union, or that they are not present in the correct atomic ratio of 63 of copper to 200 of mercury. Silver, tin, mercury alloys, whose forms remained unchanged upon setting, were found to correspond closely with the chemical formula Ag_2. Sn. Hg., or an alloy of 64⅓ per cent. silver and 35⅔ per cent. of tin, combined with 37.5 per cent. of mercury.

The evidence is that in the combination of mercury with silver and tin alloys there is a union of mercury with a radical Ag_2. Sn., no matter what the composition of the alloy might be; this constitutes a central radical.

Additions of more tin, silver, or of any other metals, caused the amalgam to deport, as though a separate amalgam were contained between the crystals of a basal amalgam of Ag_2. Sn. Hg.

More silver, as in the 80 silver, 20 tin alloy, which corresponds very closely with the formula Ag_4. Sn., and combined with mercury, made an amalgam which expanded in setting, behaving chemically as though the composition of the mass were Ag_2. Sn. Hg. + Ag_2. Hg. With the addition of tin, phenomena were observed which indicated a formula of Ag_2. Sn. Hg. + Sn. Hg. If gold were added, a secondary amalgam of Au_2. Hg. would be formed.

It is observed that, theoretically, the addition of gold should lessen the edge strength of an amalgam, not increase it, as has been heretofore held. The presence of this metal, increasing the flow of an amalgam, obscured its lack of rigidity.

The weakening of amalgam, and the increased amount of mercury necessary to effect amalgamation, when the components were mortar-mixed, is explained by the greater extent of atomic contact produced by such violence. Amalgams made with fine filings were weaker than when made of coarse alloy particles In the latter case, and in hand mixing, the amalgam mass consists of a greater ratio of the Ag_2. Sn. alloy cemented together; in the former case a weaker alloy, Ag_2. Sn. Hg., predominates.

COAGULANTS IN THE TREATMENT OF PULP CANALS.

EDWARD C. KIRK, D. D. S., PHILADELPHIA.

Dental Cosmos, March, 1894. Reviewed by H. H. Burchard, M.D., D.D.S., Philadelphia.

A digest of this article is introduced so that a parallel study may be made of the three presentations of this, of that of Dr. Truman's, and that of Dr. Harlan's.

The writer comments upon an assumption held by a number of teachers and dogmatically expounded by them, that agents which coagulate albumen are unfit for employment in pulp canals, it being taught by the same teachers that the formation of a coagulum is a bar to the diffusion of the coagulant. The essayist remarks "that despite these asseverations not defended by or founded upon actual demonstrative experiments, the generally successful clinical use of powerful coagulants as dental antiseptics indicates a serious error underlying the primary assumption."

The specific purpose of the essay is stated not to be a defense of the practice which employs these agents, or any criticism of that which condemns them, but merely a systematic experimentation governed by well recognized physical and chemical laws to demonstrate the truth or falsity of this one undemonstrated premise, "that a coagulum is an effectual bar to the diffusion of the coagulant."

The affirmative of this proposition is accredited to Dr. A. W. Harlan, of Chicago. Drs. Wm. H. Atkinson and Jas. Truman have upheld the negative, basing their opinions upon clinical records of dental practice.

After reviewing the accepted principles governing osmosis or diffusion, the writer proceeds to actual experimental test.

Experiment 1 consists in adding to a saturated solution of zinc chloride contained in a test tube, a solution of albumen, so poured that the surface of the chloride solution is not agitated. A coagulum forms immediately. Were the assumption of this coagulum forming a barrier correct, the remainder of the albumen solution should not be affected, as there would be no diffusion of the zinc chloride through the coagulum already formed. It is observed that the coagulation gradually extends throughout the entire extent of the albumen solution.

The writer next describes the probable chemical phenomena involved in the action of antiseptics, and their gradual loss by diffusion or chemical decomposition when placed in the canals of pulpless teeth. He next cites the experiments of Miller demonstrating the penetrating power of coagulants.

The next experiment consisted in taking recently extracted teeth, sealing their apical ends with melted Canada balsam, and opening their pulp chambers through the crowns without disturbing the pulps; in the later openings conical glass tubes were hermetically sealed. The teeth were now immersed to the depth of their necks in solutions of albumen contained in test tubes. A solution of zinc chloride was poured into the tubes cemented in the crowns of the teeth; in forty-eight hours the zinc salt had diffused through the substance of the teeth, coagulating the albumen in the test tubes.

In testing the diffusibility of mercuric chloride through the substance of the teeth, a solution of potassic iodid was first made; to

this, mercuric chloride was added until the precipitate of mercuric iodide was no longer redissolved; the solution was then filtered clear. It is evident that the slightest addition of mercuric chloride to such a solution will be made manifest by the production of the characteristic red precipitate of mercuric iodide.

The teeth, prepared as for testing with zinc chlorid, are immersed in the iodide solution. The tubes in the crown are filled with a solution of mercuric chloride. In three days a red precipitate is formed in the iodide solution. The writer claims, therefore to have indisputably shown that a coagulum is not an effectual barrier to the diffusion of coagulants; second, that coagulants are readily diffusible through the substance of the dentine and of the cementum.

The essayist comments upon the frequent acceptance, by dental teachers, of assertions presented as general principles which are not founded upon inductive experimentation, but too frequently upon deductive reasoning akin to guesswork.

ORIGIN OF SALIVARY CALCULI.

HENRY H. BURCHARD, D.D.S., M.D., PHILADELPHIA.

Dental Cosmos, October, 1895.

The concretions known as salivary calculi are composed of calcium salts, the phosphates greatly predominating, the carbonates in less amount, combined in some undetermined manner with organic matter, said to be mucin.

It is only man, and animals which have the food habit of man, which suffer from the deposits. The almost universal accompaniment of the dietary of civilization is lactic fermentation. Stating therefore, salivary calculi are formed only in oral cavities in which lactic fermentation is present. It is known that the reaction of the saliva as contained in the acini and ducts of the salivary glands, is alkaline. The reaction of the fluid contents of nearly all mouths is acid. The writer believed for some years that this difference in reaction caused the deposition of the lime salts; held in solution or suspension in an alkaline fluid, they were precipitated when the fluid became acid.

Experiments made with a 1% solution of lactic acid saliva showed the acid to react upon the saliva, causing a coagulation of the mucin of the latter. Coagula, as they formed, agglomerated, slowly rising to the surface of the fluid, and grew more dense with time; when dry they were found to contain salts of calcium, and to acquire the greenish brown tinge seen in some calculi. In the beginning they were soft and white.

These are substantially the conditions present in the human mouth; the combined secretions of three pairs of glands (each gland having a specific secretion) are pouring into a cavity containing a weak solution of lactic acid, the foci of acid formation being in food deposits. Innumerable small glands, secreting mucin and undetermined materials are adding their secretions to the general fluid; and some of them, excreting mucin into centers of lactic fermentation. After detailing minutely the general topographical anatomy of the oral cavity, the article states: It is seen that the points of beginning accumulation of calculi are in situations least affected by the natural cleansing agencies; muscular movements of tongue, lips, and cheeks, together with the irrigation of the fluids of the mouth.

Viewed clinically, there are three classes of the calculi; a soft, granular, light colored calculus found about the buccal faces of the superior molars, deposited from the secretion of the parotid gland, which contains a globulin, not mucin. This secretion contains a relatively large amount of CO_2, which, escaping, permits the deposition of calcium salts, held in solution by the carbon dioxide.

The next class, those about the lingual gingival borders of the inferior incisors, are harder than the preceding and darker in color; mucin is present in marked amounts. The next, the scaly deposits, are found first just beneath the gum margins. These are very dark, and frequently very hard.

The points of beginning deposit are found in the V-shaped spaces between the edges of the gums and the necks of the teeth. A coagulum of mucin containing lime salts finds lodgment, and furnishes a nidus about which may deposit other coagula and precipitated lime salts. Any projection or rough surface may also determine a point of deposit. Owing to the continued presence of these bodies, the mucosa is irritated; the mucous glands of the gingival have their secretion altered, and the products added to the

calculus. Should the primary deposit be just beneath the margin of the gums, an indefinite fluid containing mucin coming in contact with lactic acid and food débris, the result is the formation of deposits, flattened into scales through the elasticity of the overlying gum. The latter swells, becomes detached from the teeth, the deposits, having added sources of increment, increase and encroach upon the pericementum, and teeth are lost through this inflammatory degeneration (one phase of pyorrhea alveolaris). Resting upon the gums, as with deposits about the inferior incisors, calculi cause a more deliberate loss of the retaining apparatus of the teeth, but the inflammatory degeneration eventually destroys them.

COAGULANTS AND NON-COAGULANTS.

A. W. HARLAN, M.D., D.D.S., CHICAGO.

Dental Cosmos, March.

Read before the Union Meeting of the First and Second District Dental Societies of New York. Reviewed by John I. Hart, D.D.S., New York.

In ending his article the writer says: "To recapitulate the essence of this paper, I maintain the following conclusions:

First. True coagulators of serum-albumin are not diffusible when brought in contact with it in a tooth-root.

Second. Coagulators of the organic matrix of a tooth-root, tube contents (dentine), by the concretions of such albuminous matter, prevent the further entrance of such coagulators as soon as their affinity for water is satisfied.

Third. The destruction of coagulum in such situations being a foregone conclusion through the agency of anaërobic microbes, brings about a chemical change in coagulant antiseptic which deprives it of the coagulant property; hence it passes into the circulation, and is excreted as other foreign inert bodies are discharged from different channels.

Fourth. The addition of boroglyceride to a coagulant in definite proportions so alters it that it no longer acts as a coagulant; hence it is possible for it to pass through tooth-structure and be recovered from the liquid media surrounding a tooth, when its coagulating property will be restored.

Fifth. Non-coagulants soluble in water diffuse readily through tooth-structure, as has been shown repeatedly in experiments out of the mouth, not only in egg-albumin, but likewise in serum-albumin.

Sixth. Oleaginous non-coagulants pass through the structure of a tooth quite slowly in the presence of water in serum-albumin, and oils pass through filtering solutions, showing that they displace water. The vaporizable portion of an essential oil will give to a substance which it permeates the characteristic odor in from three to six hours (Watts).

Seventh. A non-coagulant disinfectant destroys developed, and deprives the spores of anaërobic pathogenic microbes of the power to be developed; and, as it does not coagulate albumin, it does not prepare a food for the sustenance of any accidental ingress of such developed organisms; hence the future of such teeth treated by non-coagulants is infinitely preferable to the conditions surrounding those treated by coagulants.

Eighth. A non-coagulant disinfectant completely sterilizes infected dentine by virtue of its diffusibility through it, while a coagulant either precipitates an insoluble barrier or so concretes the albuminous matter with which it comes in contact, that it cannot act as a perfect sterilizer, but effectually seals infectious and poisonous matters in the dentine, which ultimately have their exit through the cementum and pericementum, depriving both structures of needed vitality."

THE RELATION OF ADENOID VEGETATION TO IRREGULARITIES OF THE TEETH AND ASSOCIATE PARTS.

G. F. EAMES, M.D., D.D.S., BOSTON.

Dental Digest, September.

Read before the American Medical Association at Baltimore. Reviewed by John I. Hart, D.D.S., New York.

(1) While mouth-breathing is usually attendant upon adenoid growths, this is not always the case; while, on the other hand, mouth-breathing may exist without the presence of adenoids, or it may be due to a chronic hypertrophy of the turbinated bodies, or

some septal deformity. (2) The adenoid growth rarely fills the pharyngeal space so as to obstruct breathing, but mouth-breathing results from the irritation which it produces. (3) Mouth-breathing does not produce adenoid vegetations. (4) Mouth-breathing does not cause irregularities of the teeth. (5) Many cases present deformed arches and irregular teeth in which no adenoids exist.

It is argued by G. MacDonald that nasal stenosis is a constant factor in post-nasal growths, and that this being the case, "as long as respiration is conducted through the nose, there is, of a physical necessity, a diminution in the barometric pressure behind the seat of stenosis. This inevitably results in more or less over-filling of the blood-vessels, which, in its turn, leads to hypernutrition and hypertrophy." It is obvious that when the diaphragm is depressed, the mouth closed, and the nose partially closed, there is more or less suction produced, which would invite blood in extra amounts to the pharyngeal region; but, according to the observation of the writer, patients breathe through the mouth, both by instinct and force of habit, even when it is possible to breathe through the nose. The swollen turbinates, with their rich supply of nerves, readily convey a sense of suffocation to the brain, and the mouth is immediately opened. Moreover, the mouth opens so readily, upon so little provocation from the nasal irritation and stenosis, that it does not seem possible that sufficient "diminution of the barometric pressure" can be produced in the pharyngeal vault to cause a growth of tissue. Again, if this be true, we ask why the growths are so often pedunculated while the pressure is exerted equally in all directions. This view also necessitates nasal stenosis to begin with; but it is generally understood that the enlarged turbinates are the result, not the cause, of adenoids, and observation shows that the nasal obstruction gradually disappears after the removal of the growth. Again, this will not account for the congenital growths, and those in infants whose oral respiration has been established only a few weeks or months; and still again, those cases of nasal stenosis of long standing in which there is no adenoid hypertrophy.

It has been said that adenoid growths in the pharyngeal vault cause irregularities of the teeth. The writer does not believe this to be the case, but rather that the dental irregularities are only another expression of the same cause that operates to produce the

adenoid growth; in other words, there is one cause common to both, yet this cause may not be able in all cases to produce both. The bone-developing vital movement may be strong and active by inheritance, while the lymphatic glandular system is weak.

It has been stated that mouth-breathing necessitates a constant dropping of the lower jaw, which, in so doing, causes pressure of masseter and other muscles upon the buccal surfaces of the upper teeth and consequent flattening of the lateral alveolar arches, and the projecting forward of the cuspids and incisors. The writer cannot believe that the dropping of the lower jaw produces pressure on the teeth in the superior maxilla. The lower jaw is approximated to the upper teeth principally by the masseter, temporal, and internal pterygoid muscles, and when the jaw drops by the relaxation of these muscles, and with it other muscles and tissues of the face, unless the mouth be opened to the fullest extent by action of the platysma myoides, digastric and other muscles, the tissues of the cheek are not put upon the stretch; in fact, the finger can be easily passed in between the teeth and jaw, without being sensible of any pressure upon it, provided the mouth is not opened widely. Moreover, it seems reasonable to conclude that the jaw is held suspended, not by the cheeks, but by the masseter and accessory muscles. The cheeks cover the jaws and the teeth loosely, with tissue to spare, and will, as a rule, admit of the jaws being opened to a considerable extent without separating the lips or stretching the cheeks, which is the case during sleep; therefore, when the lower jaw relaxes sufficiently to let the air in through the mouth, it cannot put the tissues of the cheeks on the stretch, or draw them tightly against the teeth. Both observation and experiment will show that it is only necessary to open the lips slightly, in order to allow sufficient air to pass in by the mouth, and that all the tissues and muscles concerned are in a relaxed and flabby condition while mouth-breathing is going on.

Bazin is quoted as advancing the idea that the weight of the tongue in the floor of the mouth would tend to expand the lower jaw beyond its normal limits. The writer would suggest, however, that if weight is the expanding force, how can it press laterally, since gravity would carry the tongue downward into the floor of the mouth, which would rather draw the sides of the jaw together.

But if it be the muscular force of the tongue, then it is easier to see how the teeth might be pushed outward.

Dr. Henri Chattellier, of Paris, calls attention to the bones of the head and face consequent upon obstructed nasal respiration. He points out that the air-cavities, as the frontal, sphenoidal, ethmoidal, and maxillary sinuses, being normally in communication with the air, cease to develop when the circulation of air through the nose is interfered with, and hence dimensions of the face are altered. Dr. E. S. Talbot says: "There are many cases of contracted arches where mouth-breathing does not exist. There are also many cases of normal arches where it is present." The writer firmly believes that this statement is entirely correct. Marked adenoid growths are sure to produce mouth-breathing and more or less nasal stenosis; but irregularities of the teeth and deformities of the arch are not at all certain to follow as a consequence, but are rather companions, due to a common cause. Dr. Talbot further says that in most cases the cause of these deformities is an arrest of development of the bones of the nose, and this produces mouth-breathing. While this may be so, the writer would call attention to the fact that the opposite condition exists as to the turbinated bodies, which are hypertrophied.

In 1879 Prof. Harrison Allen said: "Inasmuch as the face is the result of the lateral visceral half-arches joining the median structures, projected from the front of the brain-case, it follows that if there is want of harmony between the two genetic movements, errors of symmetry will readily occur." Explanation may thus be given of symmetry of the nasal chambers, the external nose, the two halves of either of the dental arches, entirely apart from the acquired defects in the same localities. Applying this hypothesis to practice, Dr. Allen had recognized a well-defined group of cases in which the nasal chambers remained, from birth, partially or entirely occluded. Also, that in cases of obstinate nasal catarrh in children from seven to eighteen years of age, in whom the upper permanent incisors were overlapping and convergent, the two halves of the upper dental arch more or less V-shaped, the tonsils tumid, the roof of the mouth with a high, narrow vault, the cause was deep-lying and congenital, and affected all the structures of the face. Dr. Allen has frequently noted the way in which the dental

arch was narrowed and elevated in adults, in whom no history of either adenoid disease or nasal obstruction was given. It should be noticed, also, that the upper incisors approach the vertical position, sometimes overlapping, in many cases of adenoid disease, while in thumb-suckers these teeth protrude from the mouth.

CALCIFICATION OF THE TEETH.

DR. R. R. ANDREWS, CAMBRIDGE, MASS.

Read before the American Medical Association at Baltimore. Reviewed by John I. Hart, D.D.S., New York.

Calcification is a process by which organic tissues become hardened by a deposition of salts of lime within their substance. In the intercellular tissues and in the substance of the cells themselves, these salts are deposited by the rich blood-supply always near. They are deposited in minute particles, and in such fine subdivisions that it makes it difficult to demonstrate many of them, even with the higher powers of the microscope. The intercellular substance, either a protoplasmic or gelatinous fluid or semi-fluid, contains the lime particles. In it they change their chemical nature, uniting with the organic substance of the part, and form small globular bodies, which have been called calco-spherites; and these, blending or coalescing into a mass, form a substance called calco-globulin. This, which is a lifeless matter, has been deposited through the cells into a gelatinous substance, and in some cases into the substance of the cells themselves, where, by a further hardening process, it becomes the fully calcified matrix.

Mr. Rainey, Prof. Harting, and Dr. Ord say: "If a soluble salt of lime be slowly mixed with another solution capable of precipitating the lime, the resultant lime-salt will go down as an amorphous powder, and sometimes as minute crystals. But when the lime-salts are precipitated in gelatin or albumin, the character of the lime-salts is materially altered. Instead of a powder, there were found various curious but definite forms, quite unlike the character of crystals or powder produced without the intervention of the organic substance." Mr. Rainey found that if carbonate of lime be slowly formed in a thick solution of albumin, the resultant salt has changed

its character; it is now in the form of globules, laminated like tiny onions. These globules, when brought in contact with one another, become agglomerated into a single laminated mass, it appearing as if the laminæ in immediate apposition had blended with one another. The globular masses, at one time of mulberry-like form, lose the individuality of their constituent smaller globules and become smoothed down into a single mass or layer, and Mr. Rainey suggests, as an explanation of the laminated structure, that the smaller masses have accumulated in concentric layers, which subsequently coalesced; and in the substitution of the globular for the amorphous or crystalline forms in the salt of lime, when in contact with organic substances, he claims to find the clue for the explanation of the development of shells, teeth, and bone.

The most important addition to our knowledge made by Prof. Harting lay in the very peculiar constitution of the "calco-spherite," by which name he designated the globular forms seen and described by Rainey. That these are built up of concentric laminæ, like an onion, has already been stated, and Mr. Rainey was aware that albumin actually entered into the composition of the globule, since it retained its form even after the application of acid.

But Prof. Harting has shown that the albumin left behind after treatment of a calco-spherite with acid is no longer ordinary albumin; it is profoundly modified, and is become exceedingly resistant to the action of acids, alkalies, and boiling water. For this modified albumin he proposes the name "calco-globulin," as it appears that the lime is held in some sort of chemical combination, for the last traces of lime are retained very obstinately when calco-globulin is submitted to the action of acids. It is a very remarkable fact that microscopic glistening specks and globules are constantly seen at the edges of tissue where enamel, cementum, dentine, or bone are to be formed or are forming.

Robin and Magitot have described isolated spherules of lime-salts as occurring abundantly in the young pulps of human teeth, as well as in those of animals, and Tomes suggests that perhaps all deposits of lime-salts commence in this way. These microscopic, globular bodies have been called calco-spherites, and it appears as though some such process as described by Prof. Harting is transpiring within the substance of the tissues where bone, den-

tine, or enamel is to be formed. It will be noticed that near this point of formation there is always to be found a rich capillary blood-supply, and from this the lime-salts are given out. As the writer has said, near the forming matrix the tissue is seen to be full of these microscopic, glistening bodies, the minute atoms which are often spoken of as granules. The abundant appearance of these globules at the time of the formation of the enamel, and their entire absence at earlier stages, is to the writer an indication that the globules are an enamel substance, the matrix-forming calco-spherites; and following up their future confirms this. Many of them are so small as as be scarcely measurable; they are almost always spherical. The lower part of the cell toward the dentine contains the larger globules.

The growth of the enamel-rod, once begun, takes place by additions to these globules. The writer is convinced that the larger ones are composed of hundreds of the smaller ones, which have coalesced into the main mass. When enamel is commencing its process of calcification, if we examine carefully with high powers, a tissue that has been properly prepared, so that there shall be the smallest amount of shrinkage, we shall find, in that slight amount of the enamel-organ that is directly over the calcified point of dentine, in what remains of the stellate reticulum and in the stratum intermedium principally, a very large number of glistening points. Most of these are minute, microscopic, in fact. They are the forming calco-spherites, or, rather, they are the minute particles of lime from the blood-supply, changing their chemical nature as they pass into the protoplasmic juices of the part. These appear to be passing into the formative cells, and these cells superintend their formation into enamel rods, that is, they are laid from the cell against the forming rod. Within the substance of the ameloblasts they are seen to be growing larger by the smaller ones coalescing with others. If at this point of their development the layer of enamel-cells is pulled away from the cap of formed dentine, we shall see that the cap of dentine is everywhere covered with quite regularly formed globular bodies. If, on the other hand, the layer of enamel-cells is against the formed cap of dentine, the masses are assuming block-like forms, as though taking the form of the future enamel-rod. They appear to be in a gelatinous substance which is

between the dentine and the enamel cells, and here, by an unknown chemical hardening process, they become the hardened columns of the enamel.

In dentine the calcifying process goes on in much the same manner. The odontoblasts are merely masses of protoplasm, and appear to have no membrane; as is the case with the ameloblast, it has a nucleus at a point farthest from the calcifying matrix. In forming the dentine matrix, the odontoblast, or the pulp-tissue through the odontoblast, gives out a rich gelatinous substance about as wide as the layer of odontoblast cells. Everywhere between the odontoblasts, as Mummery has demonstrated, is found a rich supply of connective tissue cells, whose function appears to be the forming of a network of connective tissue fibers into this gelatinous substance, this network seeming to be a scaffolding upon which the calco-spherites, which are to form calco-globulin, are to be deposited. Into this layer the odontoblasts are also superintending the placing of the minute globules which are within them, and which have been given to them by the rich blood-supply found everywhere near their pulp ends. Into the gelatinous substance the globules form against the calcified matrix, where, fusing with others, they form a mass, entirely filling the gelatinous substance. This gelatinous substance, with its mass of globules, now becomes calco-globulin. By some natural hardening process it then becomes calcified matrix, and thus another layer of calcified matrix is formed.

We must remember that it takes a large number of sections to show these various stages of growth. Each section shows the picture at the point where death of the part has left it, another section will show another stage, and so on. In one section we shall see the odontoblasts against the gelatinous layer, with the globules within it. Another section will show an entire absence of the gelatinous layer, with pear-shaped cells a little way from the calcified matrix, and with portions of cells clinging to the calcified matrix, found here and there, that look like odontoblasts. Another section will show the globular masses filling up the gelatinous layers just before a new layer of calcified matrix is formed.

The writer is convinced that the calcifying process is much the same in the cementum. The first cemental calcification takes place

by the cementoblasts giving off these globular bodies near the neck of the tooth against the forming dentine of the root into a gelatinous substance, this also being given off by the cells. It assumes the form of plates or scales. Afterward the cells themselves appear to fill with the globules, and lose their identity in the forming matrix. That peculiar tissue which we call "tissue on the borderland of calcification," is composed of globular, glistening bodies which have coalesced and formed a layer within a gelatinous substance previously given out by the formative cells. In this condition it is a tissue indestructible both in acids and in caustic alkalies, and only in this condition is it true calco-globulin.

The essayist rejects in toto the views held by Bodecker as to the processes under discussion.

THE RELATIVE POWER OF COAGULANTS.

JAMES TRUMAN, D.D.S., PHILADELPHIA.

International Dental Journal, January.

Read before the Academy of Stomatology, Philadelphia. Reviewed by John I. Hart, D.D.S., New York.

After quoting from several writers on coagulants the writer gives the following remarks which he had made before the A. D. A., in 1889, in a discussion on root-filling: "The question that has given the writer much thought for the past two or three years is that no filling of canals can be perfect. Why? Because a large part of the tooth is made up of tubulated structure, the tubuli holding organic matter, and when the pulp dies the organic substance dies and decomposition begins immediately, and the sulphuretted hydrogen occasioned by that decomposition is the principal source of trouble. What should be done? The writer's study of the subject, and the results of many experiments, led him to the conclusion that it was essential to prevent this decomposition, and that this could be best accomplished by coagulating the organic tissue. The coagulant best adapted for this purpose is chloride of zinc, because of its great affinity for water. It will follow moisture to the very extremities of the tubulated structure, and consequently change the character of the contents so that decomposition will not

take place. The writer has kept coagulated albumin for months without change.

The position taken by the writer in 1889, that coagulants placed in the central canal would permeate the tubuli and coagulate the contents, remain true to-day, as the experiments in capillary tubes will demonstrate, and as was previously also demonstrated by Dr. Kirk. Some of these points were taken up seven years ago by the writer, but dropped for a more favorable opportunity to continue them. The intention of the writer was to endeavor to show that coagulants would penetrate tubes of minutest character possible to be handled satisfactorily, and that this penetration was independent of circulation. The earlier investigations of the writer seemed to warrant this belief. Diffusion is recognized in the living tooth as performing an important and continuous part in its nutrition. It seemed certain, as the tubulated portion of the dentine invariably imbibed finely divided colored matter in solution, that therefore it must take up any other fluid, if of equal solubility, with facility. This beyond question is true. The main difficulty here being to demonstrate that the coagulation was continuous without the aid of circulation.

The effort was, as before stated, to find results in tubes not exceeding a millimeter in diameter, and if coagulation occurred it must be through absolute contact of the agent with the albumin or gelatin used in the experiment. It was necessary to fill the minute tubes with the albumin and then seal the ends. Both processes were accomplished readily by nearly filling the tubes and then quickly melting the ends in a Bunsen burner. This proved entirely satisfactory. It was found, however, that the albumin in the tubes dried and contracted upon itself, leaving spaces. To meet this difficulty the albumin was combined with twenty per cent. of glycerine. This served an excellent purpose, and proved no interference with coagulation, either in large or small tubes, with all the agents known to be positive coagulants, with one exception. It was found that mercuric chloride had little or no effect, apparently, on albumin and glycerine. This was repeated a number of times. It was then applied to albumin without glycerine, and coagulation was immediate. It was found, however, that glycerine simply delayed coagulation, for in the course of a few days the

effect of the mercuric chloride was plainly visible in flocculent masses. This fact necessitated a repetition of all the experiments to determine their correctness. It was found that mercuric chloride was the principal one of the series seriously antagonized by the glycerine. The tubes were drawn to varying lengths not exceeding, as a rule, over 0.5 millimeter in diameter. The unit of time was fixed at ten days. The experiments were also made to include the essential oils and many agents known to be non-coagulants, for the reason that some writers have asserted that several of these produced coagulum. Further, the action on gelatin was examined into, but this was confined to but few tubes and without marked result.

Whenever possible the effort was made to have coagulation proceed in opposition to gravity. This is beautifully shown in the test-tube. What does the work as a whole teach? 1. That coagulants do not prevent by their own action the diffusion throughout the entire tube. 2. That the penetrating power of such agents as creosote, carbolic acid, and zinc chloride, those most frequently used, varies materially. That creosote is a very poor coagulant, when compared with carbolic acid, and the latter, for this purpose, is not to be compared with zinc chloride or silver nitrate. 3. That in proportion to the coagulating power of the agent will be its penetrating force, independent of gravitation. No attempt was made to determine with exactness the penetrating property of essential oils, but, if coloration is any indication, the tubes presented did not indicate that this is of much value in closed tubes; but this, it is acknowledged, may not apply in tubes where circulation is an adjunct to aid penetration. In order to test various agents, such as the essential oils, and also to repeat the tests with agents already used, as carbolic acid, chloride of zinc, creosote, etc., with albumin and glycerine, and without glycerine, and also the effect on gelatin, a series of tubes was prepared. It was observed that creolin gives but slight coagulating effect, oil of cloves about the same, carvacrol shows slight cloudiness, sanitas oil slight coagulation, mercuric chloride no coagulation in tube (glycerine and albumin). Tannic acid shows extended coagulation; oil of cinnamon, action marked but limited; oil of cajaput, no result; caustic potash, no result; zinc chloride in gelatin, no result; phenol sodique,

partial coagulation. An attempt was made to carry staining with the coagulation. Zinc chloride was colored with carmine, with the result that the coagulation left the stain and proceeded down the tube. Eugenol is but a poor coagulator. On thymol, the effect is but slight and not continuous. A test was made to show the possible action of oxy-chloride of zinc on the contents of the tubuli in the dentine. The oxy-chloride of the same consistency used in filling pulp-canals was placed in the funnel portion of a small tube. It soon hardened, but the coagulating process was marked upon the albumin. It began immediately and has continued without interruption to the present time. The line of demarcation between the oxy-chloride and the coagulation is distinctly shown. This, probably, is one of the most satisfactory of the tests, as it abundantly proves that contact with albumin is all that is necessary to produce coagulation with zinc chloride, and if this be possible out of the mouth, how much greater must it be under more favorable conditions in the tooth. Caustic potash was experimented upon, not as a coagulant, but to observe the effect on albumin and gelatin. Though several tests were made, no visible result was produced, though this does not antagonize the recognized quality of this agent as one of the most deeply penetrating and uncontrollable caustics used on the tissues. The action of nitrate of silver, in repeated tests, was rather a surprise. It has generally been regarded as a superficial coagulant, but in every instance it has proved deeply penetrating, and coagulating with rapidity and certainty, very nearly equal to zinc chloride. This fact assumes some importance in connection with the use of this agent in teeth. Its rapid penetration raises the question, Can we use it without danger to the pulp in posterior teeth, as has been recommended? At present the writer is not prepared to answer this question, but it seems as though a risk equal to that assumed in the use of zinc chloride is taken when placed in children's teeth for the prevention of caries.

The experiments were extended to the penetration of the tooth structure by a number of coagulating agents. A large number of teeth were kept under the action of these, the pulp-canals being first slightly enlarged and filled with the agent daily. The result has not been entirely satisfactory; microscopic examination shows decided action throughout the dentine, the tubes in several sections

being nearly obliterated and indicated only by fine lines; but while this demonstrates a positive change in the organic contents of the tubes, it does not absolutely show that this has been caused by the coagulant. Thus far the writer has been unable to carry the stain given by the agent along with the coagulation. Silver nitrate in several sections penetrated in seven days two-thirds the length of the tubes, but the extreme discoloration made it impossible to follow the individual tubes, except at the extreme limit of coloration. Tests were made with a variety of stains, but with no result, the coagulation invariably separating from the stain. When the color can be carried along with the coagulation, it will visually show what may be regarded as absolutely true, that the coagulant is carried in the dentinal tubes as effectually as in those exhibited.

In the specimens prepared for the microscope the evidence is positive to the trained eye that every tube is filled with coagulated organic matter, and this has been so frequently repeated, and with precisely the same results, that the writer has no hesitation in accepting it as a fact; having failed, however, to observe any change in the cementum, he is therefore led to doubt the possibility of any coagulating effect in that tissue by any of the agents used.

An attempt was made to verify Dr. Kirk's experiment of cementing a tube in a tooth, sealing the foramen, and then filling the tube with an active coagulant, as zinc chloride. Six perfectly fresh teeth were taken, tubes cemented, and foramen closed. The tubes were of varying length, and fluid in them ranging from a column of seven to eighteen centimeters. These were placed in a second tube filled with egg-albumin. The result in four was that coagulation began, after several hours, at points indicating leakage. One of these was removed, the leak covered with paraffin, and reinserted. This has remained imbedded in the albumin for over a month, without any result. In two cases the leak evidently was not through defective manipulation, but appeared to be from an invisible crack in the enamel, and at the bifurcation of molar roots. This demonstrates the conclusions arrived at by microscopic tests, that zinc chloride, the agent used, cannot penetrate through the cemental tissue. If this cannot be done by the force of the column of fluid, it certainly cannot by diffusion.

In the paragraph quoted from a portion of the writer's re-

marks in 1889, he stated his faith in coagulation as a remedy for discoloration and an effectual barrier to the ingress of micro-organisms into the dentinal tubes. The writer is still of the same opinion, and the only modification that he would make of these views, then expressed, would be the fear of the possibility of the action of the zinc chloride upon the pericementum through its penetrating power, passing out through the foraminæ if more than one exists. His observations, as heretofore stated, do not show that the use is at all dangerous, if care be taken to close the upper third of the canals thoroughly before placing the coagulant in the tooth. Clinically, the writer has observed in one case only an action upon the pericementum, which he has been led to attribute to the zinc chloride passing through the foramen. The large clinical experience in filling root canals with oxychloride of zinc, now covering many years and a large number of practitioners, seems to show that it can be used without risk, provided proper precautions be taken. In the use of zinc chloride as an obtundent of sensitive dentine, there cannot be two opinions. The experiments demonstrate, beyond cavil, that this agent is exceedingly dangerous to the life of the pulp, and should be abandoned for that purpose.

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American Journal Dental Science, Baltimore, Md., 9 West Fayette St. Editors, F. J. S. Gorgas, A.M., M.D., D.D.S., Richard Grady, M.D., D.D.S. Publishers, Snowden & Cowman Mfg. Co. Price $2.50.

Dental Cosmos, Philadelphia, Pa., Chestnut, corner Twelfth St. Editor, E. C. Kirk, D.D.S. Publisher, The S. S. White Dental Manufacturing Co. Price $2.50.

Dental Register, Cincinnati, O., 117 West Fifth St. Editors, J. Taft, D.D.S., W. H. Whitslar, D.D.S., N. S. Hoff, D.D.S. Publishers, S. A. Crocker & Co. Price $2.00.

Dental Review, Chicago, Ill., 66 Madison St. Editors, A. W. Harlan, M.D., D.D.S., T. L. Gilmer, M.D., D.D.S., Geo. J. Dennis, M.D., D.D.S., Thos. E. Weeks, D.D.S. Publishers, H. D. Justi & Son. Price $2.50.

International Dental Journal, Philadelphia, Pa., 716 Filbert St. Editors, James Truman, D.D.S., Geo. W. Warren, D.D.S. Publishers, International Dental Journal Publication Co. Price $2.50.

Dominion Dental Journal, Toronto, Canada, P. O. Box 418. Editors, W. Geo. Beers, L.D.S., 47 Union Ave., Montreal, and associates. Publishers, Dominion Dental Journal Co. Price $1.00.

Items of Interest, Philadelphia, Pa., 1413 Filbert St. Editor, T. B. Welsh, M.D. Publishers, Wilmington Dental Manufacturing Co. Price $1.00.

Ohio Dental Journal, Toledo, O. Editor, L. P. Bethel, M.D., D.D.S., Kent, O. Publishers, Ransom & Randolph Co. Price $2.00.

Pacific Stomatological Gazette, San Francisco, Cal., 536 Clay St. Editors, R. H. Cool, D.D.S., and associates. Publisher, Pacific Stomatological Gazette Publishing Co. Price $2.50.

Southern Dental Journal, Macon, Ga. Editors and publishers, Holmes & Mason. Price $2.00.

Western Dental Journal, Kansas City, Mo., 906 Grand ave. Editor, J. D. Patterson, D.D.S. Publishers, R. I. Pearson & Co. Price $2.00.

Dental Digest, Chicago, Ill., 2231 Prairie Ave. Editor, J. N. Crouse, D.D.S. Publisher, J. N. Crouse, D.D.S. Price $2.00.

BI-MONTHLY.

Dental Office and Laboratory, Philadelphia, Pa., 620 Race St. Editor, Theodore F. Chupein, D.D.S. Publishers, Johnson & Lund. Price $1.00.

Dental Journal, Ann Arbor, Mich. Edited by students. Price 50 cents.

La Rêvista Dental Americana, Philadelphia, Pa. Editor, C. E. Edwards, D.D.S. Publisher, R. W. Edwards, D.D.S. Price $1.00.

QUARTERLY.

Atlanta Dental Journal, Atlanta, Ga. W. G. Browne, editor. Published by W. G. Browne Dental Co.

Dental Practitioner and Advertiser, Buffalo, N. Y., 587 Main St. Editor, W. C. Barrett, M.D., D.D.S. Publishers, Buffalo Dental Manufacturing Co. Price $1.00.

Dental Headlight, Nashville, Tenn., 307 N. Summer St. Editors, H. W. Morgan, M.D., D.D.S., Ambrose Morrison, M.D. Publishers, Morrison Bros. Price 50 cents.

Odontographic Journal, Rochester, N. Y., 117 State St. Editor, J. Edward Line, D.D.S. Publishers, Rochester Dental Manufacturing Co. Price $1.00.

Pacific Dental Journal, Tacoma, Washington. Editor, W. E. Burkhart. Publishers, Burkhart Dental Supply Co. Price $1.00.

Texas Dental Journal, Dallas, Texas. Editor, John C. Storey M.D., D.D.S. Publisher, A. P. Cary. Price $1.00.

ENGLAND—SEMI-MONTHLY.

British Journal of Dental Science, London, 289 Regent St. W. Editor not given. Publishers, J. P. Segg & Co. Price 14 shillings.

MONTHLY.

Dental Record, London, 6 to 10 Lexington St. Editor not given. Publishers, The Dental Manufacturing Co. Price 7 shillings, 6 pence.

Journal of the British Dental Association, London, 20 and 21 King William St., Strand. Editor not given. Publishers, Bailliere, Tindall & Co. Price 7 shillings.

FRANCE—MONTHLY.

L'Odontologie et la Revue Internationale d'Odontologie, Paris, 57 Rue Rochechouart. Editor, Paul Dubois. Price 12 francs.

Le Monde Dentaire, Paris, 9 Rue de Londres. Publisher, Paul Vasseur. Price 5 francs.

L'Avenir Dentaire, Paris, 37 Boulevard de Sebastopol. Editor, Dr. Delaunay. Publisher, F. Menetrier. Price 5 francs.

Le Progrès Dentaire, Paris, 22 Rue du 4 Septembre. Editor not given. Publisher, C. Ash & Son. Price 12 francs.

Revue Odontologique, Paris, 3 Rue de l'Abbaye. Publishers, l'Association de l'École Odontotechnique. Price 12 francs.

GERMANY—WEEKLY.

Journal fur Zahneilkunde, Berlin, Chausseestrasse, 1 a. Editor, Dr. Erich Richter. Publisher, Erich Richter. Price 7 marks.

Zahnarztliches Wochenblatt, Hamburg, Bei dem Zippelhause 7–9. Editor, Dr. Max Lustig. Publisher, F. W. Rademacher. Price 10 marks.

Zahnarztliche Rundschau, Berlin, Claudiusstr 15. Editor, Max Bejach. Price 10 marks.

MONTHLY.

Deutsche Monatsschrift fur Zahnheilkunde, Leipzig, Konigsstrasse, 18. Editor, Jul. Parreidt. Publisher, Arthur Felix. Price 14 marks.

Monatsschrift Des Vereins Deutscher Zahnkünstler, Leipzig, Hainstrasse 26. Editor, Arthur Stolper. Price 9 marks.

BI-MONTHLY.

Die Zahntechnich Reform, Berlin, Köpenickerstrasse 114. Editor, G. H. Pawelz. Publisher, R. F. Funcke. Price 7 marks.

QUARTERLY.

Correspondenz-Blatt fur Zahnärzte, Berlin, Jagerstrasse 68. Publisher, C. Ash & Son. Price 5 marks.

AUSTRIA—BI-MONTHLY.

Odontoskóp, Budapest, Gizella Ter 2. Editor, Iszlai József. Publisher, I. József. Price 2 marks.

QUARTERLY.

Oesterreichisch Ungarische Vierteljahrsschrift für Zahnheilkunde, Vienna. Singerstrasse nr. 8. Editor, Julius Weiss. Publisher, Julius Weiss. Price 5 marks.

HOLLAND—MONTHLY.

Tijdschrift voor Tandheelkunde, Amsterdam. Publishers, Dr. Erven H. Van Munster & Son.

SWITZERLAND—QUARTERLY.

Schweizerische Vierteljahrsschrift für Zahnheilkunde, Zurich, Lowenplatz 45. Editors, Dr. C. Redard and Dr. Theo. Frick. Publishers, Societe Odontologique Suisse. Price 12 francs.

ITALY—BI-MONTHLY.

L'Odontologia, Palermo, V. Montevergini 2. Editor, Luigi Ribolla-Nicodemi. Publisher, Luigi Ribolla-Nicodemi. Price 5 Lira.

QUARTERLY.

Giornale di Correspondenza pei Dentista, Milano, Via Tomaso Crossi 2. Editor, Cav. Dott. Alberto Coulliaux. Publishers, C. Ash & Sons.

SWEDEN—QUARTERLY.

Odontologisk Tidskrift, Stockholm. Editor, Ernst Sjoberg. Price 10 kronor.

DENMARK—MONTHLY.

Skandinaviska Tandlakareforengens Tidskrift, Copenhagen, Radsusstraede 1. Editor, Carl Christensan. Publisher, Martius Truslsens Bogtrykkeri. Price 8 kr.

RUSSIA—MONTHLY.

Messager Odontologique, St. Petersburg, Newsky No. 79. Editor, Dr. A. P. Sinitzin. Publisher, A. P. Sinitzin.

SPAIN—MONTHLY.

La Odontologia, Cadiz, San Jose No. 2. Editor, Dr. Florestan Aguilar. Publisher, Aguilar y Cia. Price 10 pesetas.

Revista Estomatologica, Madrid, Paseode Recoletos 21, entresuelo. Editor, D. L. Whitmarsh. Publisher, C. Garcia Velez. Price 20 francos.

NORWAY—MONTHLY.

Den Norske Tandlaegeforenings Tidende, Christiania. Editor, O. Seel.

FINLAND—QUARTERLY.

Skandinaviska Tandlakakareforeningsns Tidskrift, Helsingfors. Editor, Dr. Matti Ayrapaa. Price 8 kronor.

CUBA—MONTHLY.

Revista Dental, Havana, Salud 39. Editor, Alberto Colon. Publisher, A. Colon. Price $2.50.

JAPAN.

Dental Journal, Tokio. Publisher, Ousaburo Midzuhoya.

The Shikwa-Igaku-Sodan. Editor, M. Chiwaki. Publisher, Tokayama Dental College, Tokio. Price 60 sen.

SOUTH AMERICA—MONTHLY.

Anales de la Sociedad Dental de Bogota, Bogota, Colombia, Apartado 122. Editor, Dr. Sebastian Carrasquilla. Price $2.00.

BOOKS AND PAMPHLETS PERTAINING TO DENTISTRY, PUBLISHED DURING THE YEAR.

BOOKS.

A System of Oral Surgery, sixth edition. By James E. Garretson, A.M., M.D., D.D.S. J. B. Lippincott Co., Philadelphia.

Catching's Compendium of Practical Dentistry for 1894. By B. H. Catching, D.D.S., Atlanta, Ga.

Dental Medicine, a Manual of Dental Materia Medica and Therapeutics. By F. J. S. Gorgas, A.M., M.D., D.D.S. Fifth edition. P. Blakiston, Son & Co., Philadelphia.

Dental Materia Medica and Therapeutics. By James Stocken, L.D.S. H. K. Lewis, London.

Dental Microscopy. By Hopewell Smith, L.D.S. Dental Manufacturing Co., London.

Formulaire de Medecine et de Chirurgie Dentaires. By Noel H. Thomson, D.E.D.P. J. B. Belliere et Fils, Paris.

General Surgery and Pathology for Dentists. By Edmund W. Roughton, B.S., M.D., F.R.C.S. J. P. Segg & Co., London.

Kronen und Brucken Arbeiten. Von Hans Riegner. Arthur Felix, Leipzig.

Methoden und Neuerungen auf dem Gebiete der Zahnheilkunde. Von Wilh. Herbst. Bremen.

Microphotographs of Dental Histology. By Chas Rose, M.D., and Alfred Gysi, D.D.S., Zurich.

Outlines of Dental Pathology. By Louis Ottofy, D.D.S. H. D. Justi & Son.

Pearson's Dental Appointment Book. R. I. Pearson & Co., Kansas City, Mo.

Physical Characteristics of the Human Teeth. By G. V. Black, M.D., D.D.S. S. S. White Dental Manufacturing Co., Philadelphia.

The Angle System of Regulation and Retention of the Teeth, and Treatment of Fractures of the Maxillæ. Fourth Edition. By Edward H. Angle, D.D.S. S. S. White Dental Manufacturing Co., Philadelphia.

Transactions of the American Dental Association. S. S. White Dental Manufacturing Co., Philadelphia.

Transactions of the Southern Dental Association. Wilmington Dental Manufacturing Co., Philadelphia.

Transactions of the World's Columbian Dental Congress. Two volumes. Edited by A. W. Harlan, A.M., M.D., D.D.S., assisted by Louis Ottofy, D.D.S., Chicago.

Transactions of the Midwinter Fair Dental Congress, San Francisco.

Useful Hints for the Dentist. By W. H. Steele, D.D.S. Wilmington Dental Manufacturing Co., Philadelphia.

World's History and Review of Dentistry. By Herman Lenmalm, D.D.S. H. D. Justi & Son, Chicago.

PAMPHLETS.

Dental Education. By H. H. Johnson, D.D.S., Macon, Ga.

L'Articulation Alveolo-Dentaire L'Homme. By Edouard Beltrame. J. B. Billiere et Fils, Paris.

Proceedings of the Tri-State Dental Meeting of the State Associations of Ohio, Indiana, and Michigan. S. S. White Dental Manufacturing Co., Philadelphia.

Transactions of the State Dental Society of New York.

Transactions of the American Dental Association of Europe. J. H. Spalding, D.D.S., Sec., Paris.

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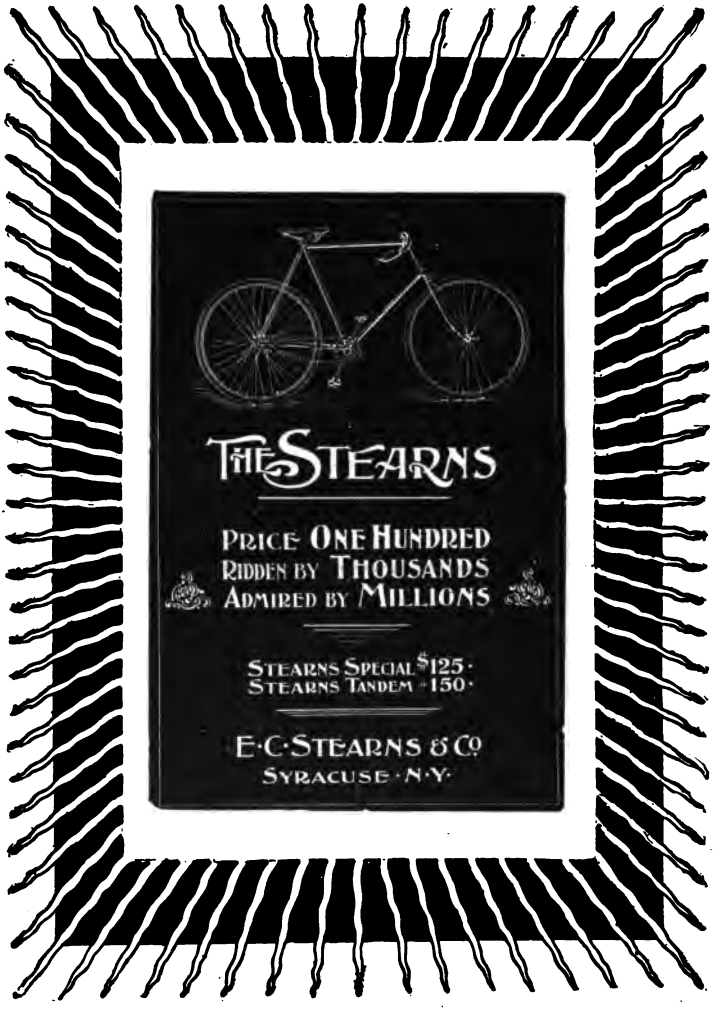
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The new college building occupies a prominent position among a group of fourteen others, comprising medical colleges, hospitals and schools.

The lot on which the building stands has a frontage of eighty-five feet, and a depth of one hundred and twenty feet It is a five-story and basement structure, the basement and first story being of rock-faced Bedford stone, and the superstructure of pressed brick and terra-cotta with terra-cotta t immings. The addition to be made to the building this coming summer will double its present capacity.

The building has two entrances, the main one through a large cut stone doorway surmounted by a stone arch beautifully ornamented with carved work. The interior is finished in hard wood, according to the latest idea of elegance. convenience and comfort.

The entire six floors of the building are divided into lecture rooms, class rooms, clinic rooms, etc., with the exception of the second floor, which is devoted to the Dental Infirmary. The chief lecture room has a seating capacity for four hundred and fifty students. There is also a dissecting room, thoroughly equipped with all the requisites for the study of human anatomy.

There are Histological, Chemical, Bacteriological Laboratories; also Laboratories for the study of Operative and Prosthetic Technics, and one for the construction of artificial dentures.

The building occupied by the Chicago College of Dental Surgery is, in all its appointments, one of the most perfect and complete of its kind.

Letters of inquiry should be addressed to

DR. TRUMAN W. BROPHY, Dean,
126 State St., CHICAGO, ILL.

Chicago College of Dental Surgery.

DENTAL DEPARTMENT OF LAKE FOREST UNIVERSITY.

The Annual Winter Course of Instruction will begin about October 1st, 1896, and end about April 1st, 1897.

Three full winter courses of lectures are required before graduation. Graduates of reputable pharmaceutical and undergraduates of medical colleges are admitted to the second year course, and can become candidates for graduation after taking two winter courses of lectures.

GRADUATION IN MEDICINE.

Graduates of the Chicago College of Dental Surgery will be admitted to the medical colleges, and may become candidates for graduation in medicine after attending two full courses of lectures.

Graduates of the Chicago College of Dental Surgery are excused from the lectures on anatomy, physiology and chemistry, from chemical and histological laboratory work and dissecting.

Students desiring to graduate in medicine are required to notify the Dean in writing of their intention at the beginning of their second course.

TOPICAL STATEMENT OF WORK.

FIRST YEAR.

During the Freshman year the studies taken up are Anatomy, Physiology, Materia Medica, Dental Anatomy, Theoretical and Practical Chemistry, Histology and Operative and Prosthetic Technics.

SECOND YEAR.

In the Junior year the student completes the work in Anatomy, Physiology, Materia Medica, Chemistry, Histology Bacteriology, and Pathology and Operative and Prosthetic Dentistry.

THIRD YEAR.

During the Senior year the students listen to lectures on Oral Surgery, Therapeutics, Dental Anatomy and Pathology, Orthodontia and Operative and Prosthetic Dentistry In addition to this they receive instruction in Crown and Bridge Work, all kinds of Plate Work, and are required to operate in the Infirmary.

Matriculation Fee, good to the close of the term ..... $ 5.00

General Ticket 100.00

There will be no separate fees for Chemical and Histological Laboratory work, dissecting and final examinations as h retofore.

Fees for the Annual Spring and Summer Course.

Matriculation Fee, good till the following April..... $ 5.00

Tickets for the Course..... 20.00

This amount will be deducted from the fees of the next following winter session.

Instruments and appliances for clinical department will cost from $25 to $40.

Board, including light and fuel, can be obtained at a convenient distance from the college at from $4 to $6 a week.

Graduates of the College are requested to notify the Dean of changes in their residences.

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*A fee of $5 must be deposited to cover chemicals and breakage in the Chemical Laboratory.

Letters of inquiry should be addressed to

DR. TRUMAN W. BROPHY, Dean,
126 State St., CHICAGO, ILL.

Pennsylvania College of Dental Surgery.

Eleventh St., below Spruce, corner of Clinton.

FORTY FIRST ANNUAL SESSION, 1896-97.

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WILBUR F. LITCH, M.D , D D.S., Professor of Prosthetic Dentistry, Materia Medica and Therapeutics.
HENRY LEFFMANN, M.D., D.D.S., Professor of Chemistry and Metallurgy.
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This College has accepted the requirements of the National Association of Dental Faculties with regard to admission and graduation of students. (See announcement for 1896-97, which can be procured from the Dean.)

THE SPRING AND FALL SESSIONS.

THE SPRING COURSE commences on the second Monday in April and continues until June 20th. Fee, $50, which will be credited upon the fee for the regular session.

THE FALL COURSE will commence on September 4, and continue until the first of October, and will be free to those who matriculate for the regular session.

Attendance upon the Spring and Fall Courses will be deemed equivalent to the term of pupilage under a private preceptor.

THE REGULAR SESSION

Will commence on October 1, 1896, and continue until the 2d of April ensuing. Twenty lectures will be delivered each week on the various branches taught.

CLINICAL PRACTICE.

Lecture hours excepted, general clinical practice is available for the student continuously through the day. Competent instructors are always present.

GRADUATION IN MEDICINE.

By an arrangement with Jefferson Medical College, such students as may desire to do so, can, if found qualified, obtain the two degrees, in Dentistry and Medicine, in five years. Students desiring to graduate in medicine are required to notify the Dean of their intention at the beginning of their second course.

FEES.

Matriculation (paid but once)	$ 5 00
For each year (Demonstrator's Ticket included)	100 00
Dissecting Fee	10 00
Diploma Fee	30 00

Board can be obtained at from $4 to $6 per week.

The Instruments and Tools required can be procured for from $35 to $45. This sum does not include the price of Dental engine.

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C. N. PEIRCE, D. D. S., Dean, 1415 Walnut St., Philadelphia.

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CHARLES F. BEVAN, M.D., Clinical Professor of Oral Surgery.
J. W. CHAMBERS, M.D., Professor of Anatomy.
GEORGE H. ROHE, M.D., Professor of Materia Medica.

Lecturers.

R. BAYLY WINDER, Phar. G., D.D.S., Materia Medica.
WM. F. SMITH, A.B., M.D., Regional Anatomy.
J. N. FARRAR, M.D., D.D.S., Irregularities.
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The Baltimore College of Dental Surgery, the first and for many years the only dental school, offers facilities for the study of dentistry proper such as age and experience only can give. Its immense museum, complete apparatus, large and well arranged building, and carefully studied curriculum give to its students great advantages and opportunities, both theoretical and practical, while its age gives its diploma a dignity far outranking all other colleges—a diploma honorably represented in all civilized countries, and held by the most distinguished members of the dental profession.

The fact that dentistry must be practically taught is fully recognized, the College Infirmary, a most complete, large and handsome hall, being daily filled with clean and respectable patients, of a class nearly equal to those of the average dentist. The Infirmary is open all the year, students paying an entrance fee, which is deducted from those of the regular succeeding course.

The session begins October 1, closing in March. A large corps of demonstrators always present, put in actual practice the teachings of all lecturers in dentistry—leaving nothing undemonstrated. All methods are fully taught, all appliances and apparatus used; the making of instruments and the most elaborate gold and continuous-gum work, and all the cases arising in ordinary practice, with many which are rarely seen, carefully demonstrated.

The College has formed an alliance with the College of Physicians and Surgeons, by which its students are privileged to attend all lectures and clinics. The patients of this medical school numbered last year over 40,000.

Graduates of the Baltimore College of Dental Surgery are required to attend but one session at the College of Physicians and Surgeons prior to presenting themselves as candidates for the degree of M. D. (See Catalogue.) In accordance with the resolutions adopted by the National Association of Dental Faculties, which went into effect for the session of 1891 and 1892, the qualifications for entering the first year's course are a preliminary examination in the ordinary English branches.

TERMS OF GRADUATION.—Attendance on three winter courses of lectures in this College; as equivalent to one of these we accept one course in any reputable dental college. Graduates in Medicine can enter the Junior class

BENEFICIARY STUDENTS.—Each State Dental Society is privileged to send one Beneficiary Student to this college at one-half the regular fees. This has been for some years an established feature of this college.

FEES.—Matriculation (paid once only), $5. Tuition fees, $100. Diploma fee, $30. Dissecting fee, $10.

Students corresponding with the Dean will please be careful to give full address, and direct their letters to

PROFESSOR M. W. FOSTER, Dean,
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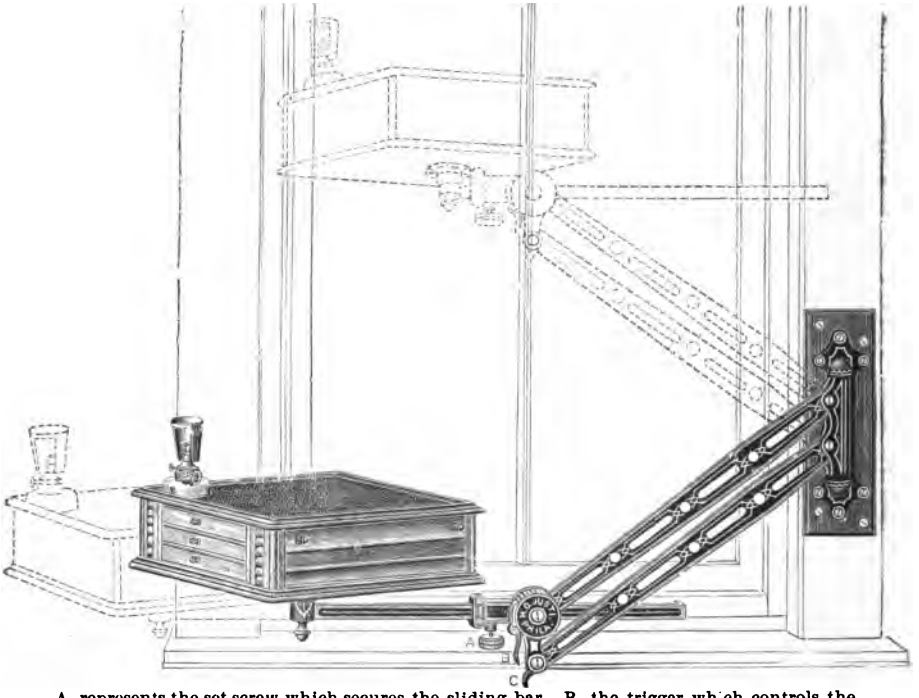

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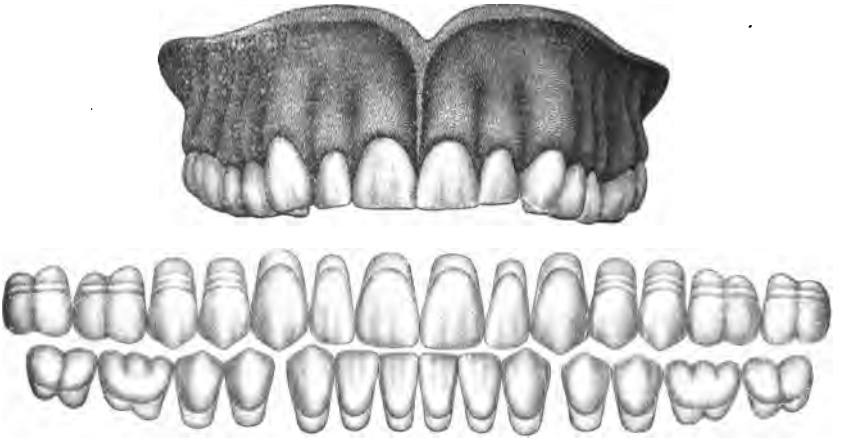

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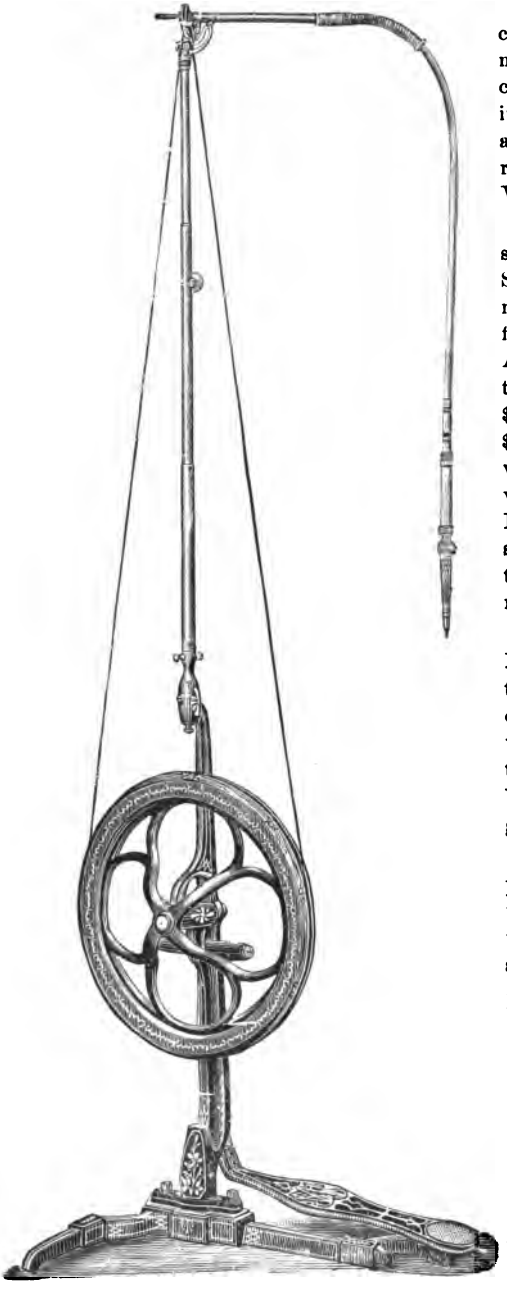

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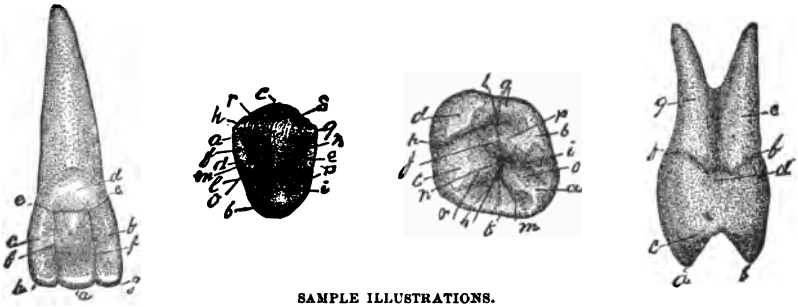

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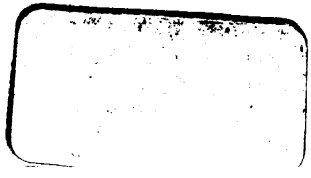

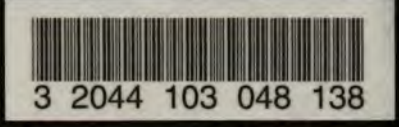
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